

PRACTICAL VEGETABLE GROWING

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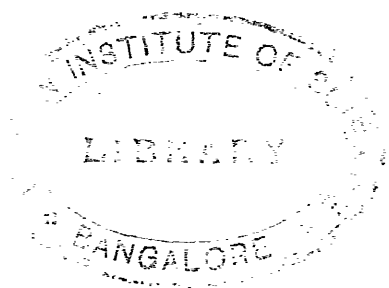
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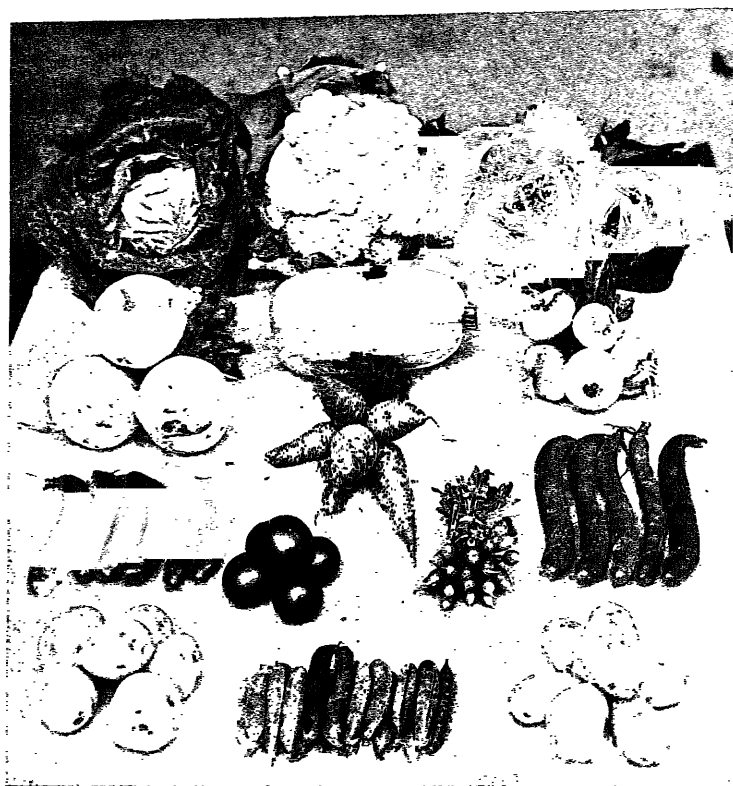
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A Collection of Vegetables.

Frontispiece.

CONTENTS

CHAPTER	PAGE
INTRODUCTION	9
I. ARTICHOKE—	
Globe	13
Chards	15
Jerusalem	15
Chinese	16
II. ASPARAGUS	17
III. BEANS—	
Broad	25
Dwarf	29
Runner	35
IV. BEET—	
Garden	38
Sugar	41
Seakale	43
V. BORECOLE	44
BROCCOLI	44
BROCCOLI, SPROUTING	49
VI. BRUSSELS SPROUTS	50
VII. CABBAGE	53
Pickling or Red	56
Colewort or Collard	56
Savoy	56
VIII. CARROT	59
IX. CAULIFLOWER	66
X. CELERY	70
XI. HERBS—	
Angelica	78
Balm	78
Basil Bush	78
Basil Sweet	78
Borage	79
Chervil	79
Clives	79
Fennel	79
Marjoram (Pot)	79
Marjoram (Sweet or Knotted)	80
Mint	80

CHAPTER	PAGE
XI.— <i>Continued.</i>	
Parsley - - - - -	81
Sage - - - - -	82
Savory (Summer) - - - - -	82
Savory (Winter) - - - - -	82
Sorrel - - - - -	83
Tarragon - - - - -	83
Thyme (Common) - - - - -	83
Thyme (Lemon) - - - - -	83
XII. KALE - - - - -	84
XIII. LEEK - - - - -	86
XIV. LESSER GROWN VEGETABLES—	
Cardoon - - - - -	90
Chicory - - - - -	91
Cress - - - - -	91
Endive - - - - -	92
Horse Radish - - - - -	93
Mustard - - - - -	93
Salsify - - - - -	94
Scorzonera - - - - -	95
XV. LETTUCE - - - - -	96
Cabbage - - - - -	96
Cos - - - - -	96
XVI. MUSHROOM - - - - -	101
XVII. ONION - - - - -	106
XVIII. PARSNIP - - - - -	114
XIX. PEA - - - - -	116
XX. POTATO - - - - -	122
XXI. RADISH - - - - -	137
XXII. RHEUBARB - - - - -	139
XXIII. SEAKALE - - - - -	143
XXIV. SHALLOT - - - - -	148
XXV. SPINACH - - - - -	151
XXVI. TURNIP - - - - -	155
XXVII. VEGETABLE MARROW - - - - -	161
XXVIII. ROTATION OF CROPS - - - - -	166
XXIX. MARKETING OF CROPS - - - - -	169
XXX. THE FINANCIAL SIDE - - - - -	175
INDEX - - - - -	177

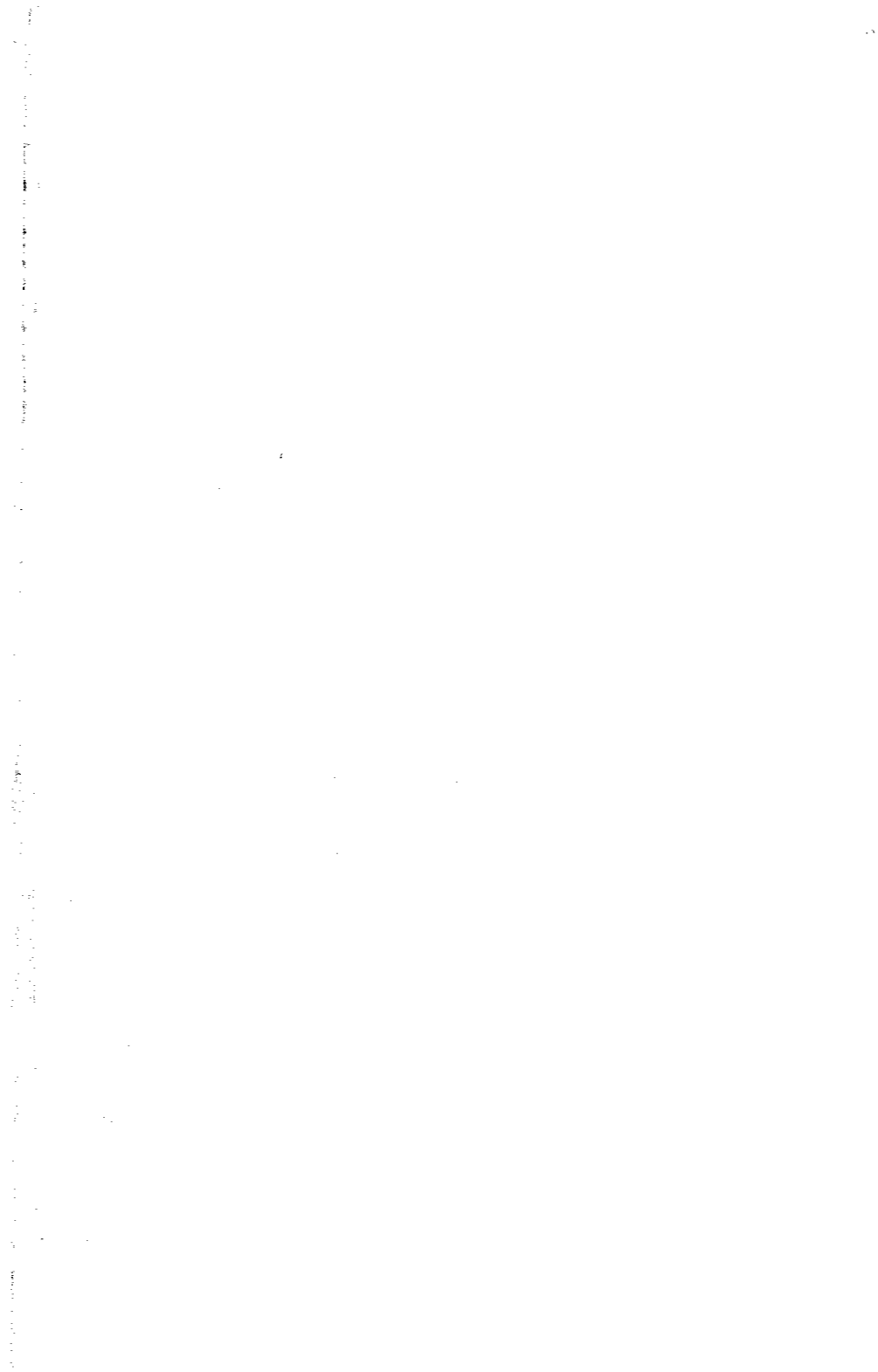
LIST OF ILLUSTRATIONS

PLATES—

A Collection of Vegetables	-	-	-	-	-	<i>Frontispiece</i>
						PAGE
Pinching out Tops of Broad Beans	-	-	-	-	-	25
Thinning out Carrots	-	-	-	-	-	59
Replacing Cauliflower Plants	-	-	-	-	-	66
Keeping Celery Rows Clean	-	-	-	-	-	70
Thinning out the Onion Bed	-	-	-	-	-	106
Marking out Drills for Seed Sowing	-	-	-	-	-	155
Pinching back Leaders of Vegetable Marrows	-	-	-	-	-	161

LINE DRAWINGS IN TEXT—

Method of Sowing Broad Beans in Double Rows	-	-	-	-	-	25
Different Types of Dibbers	-	-	-	-	-	54
Long-rooted Carrots	-	-	-	-	-	59
Stump-rooted Carrots	-	-	-	-	-	63
Method of Working Drills	-	-	-	-	-	97
Ridge Mushroom Bed	-	-	-	-	-	102
Chitting Potatoes in Trays	-	-	-	-	-	127
Storing and Covering Potatoes	-	-	-	-	-	129
Drawing Soil over Small Seeds	-	-	-	-	-	137
Drill Marker	-	-	-	-	-	155



INTRODUCTION

THE production of vegetables is one of our most important industries. That there are larger industries is admitted, but there is none which is more closely connected with the welfare of the nation.

Competition has to be faced from overseas, particularly from our nearer neighbours, so far as the more perishable vegetables are concerned. Those which are less perishable are brought from a greater distance. The quality of the finest vegetables grown in this country is higher than that of those which are imported. Such vegetables can be sold at a profit even in seasons of over-abundance.

Market gardening is a business which, to be successful, needs several kinds of knowledge. Not only must soil conditions be thoroughly understood, but some knowledge of profit and loss is also necessary, as well as a knowledge of the more practical side of the cultivation of vegetables.

This practical side is the most important, because it is the foundation upon which success or failure depends. Without it a knowledge of profit and loss, or of soils, is useless.

Practical knowledge of the cultivation of plants may be obtained in several ways. The commonest way of acquiring the knowledge is to work for some time for a successful market gardener; another way is to go as a pupil on a market garden.

There are throughout the country many educational institutions which specialise in horticultural training. There is also a good deal of literature on the market devoted to the various branches of horticultural practice.

It is certain that a great deal of benefit may be derived from at least a year in one of the horticultural training centres, while it is also a fact that those connected with the soil, whether in the capacity of employers or workers, do not make the greatest possible use of the literature at their disposal.

Far more knowledge may be definitely obtained from careful reading than is realised by the majority of those whose

living depends upon the land. The study of books and papers is, however, growing, and undoubtedly greater use will be made of this method of obtaining knowledge than has been the case in the past.

The amount of capital needed to make a start as a market gardener is elastic. A small piece of land may be rented and worked by the tenant, from which the produce is sold, for a very few pounds. To start as a full time market gardener, however, intending to make one's living altogether by the produce obtained from a garden of this kind, will require a bigger amount of cash, even if as much as possible of the work is done by the grower; but even then the money needed is not a big amount. With from two to three hundred pounds carefully invested in hiring the right kind of land, and the implements for working it, to say nothing of suitable seed, one can go a long way towards becoming a full-fledged market gardener. The amount of capital which may, if desired, be put into the business, however, is not in any way limited. This applies only to those having a thorough understanding of the business.

Conditions vary considerably in different parts of the country, and because of this the vegetables to which the greatest amount of land is devoted will vary, and the methods of bringing the different crops to perfection must vary also. In certain parts of the country, soil, climatic, and other conditions favour the production of early crops; and to these a great part of the attention of the grower is devoted. In another part the production of such crops entails a great amount of labour and expense, and is on the whole unprofitable. The grower here may devote his time and attention to the cultivation of main or late crops with good results.

Generally speaking, however, with modern methods it is possible throughout a very big area to grow early, main, and late crops successfully, although some districts are less suited to one than to the other of these.

The grower whose garden is near to a town of considerable size has a market ready to hand. He may take his produce direct to the retailer, or may become to his advantage a retailer himself. The market gardener who lives in the country has not this advantage. It is true that he may in time form a connection with reliable retailers in different districts, and these he may keep regularly supplied with his produce. For this

class of work it is very necessary to have crops coming in over as long a period as possible, for the shopman likes to keep in touch with growers who are able to send him steady and regular supplies.

The whole of his produce must often be transported a considerable distance before being sold, and this adds to his expenses, and, in addition, a great part of his crops are often sold on commission.

Whatever the method of marketing, the price of vegetables will vary from season to season. The market gardener cannot control the price of his goods, but he can, up to a point, ensure reasonably good crops.

It is true that in certain exceptional seasons one or two of his vegetables may, in spite of the most careful cultivation, fail to produce a full crop. This may be due to climatic conditions, such as a late frost, against which the grower is powerless; or it may be due to attack by some pest or disease. It is not suggested that heavy loss can always be prevented, but it is certain that the chances of such loss may be very considerably minimised, so that they are the exception rather than the rule.

Market gardening is very hard work. Indeed, to wrest a living from the soil in these days in any way is no easy matter; but of the different occupations connected with the land, market gardening holds its own better than most, and the prospects for the market gardener remain bright.

It is as well to remember that with vegetables, as with farm crops, a small saving in the cost of cultivation may mean a reasonable profit, while a very small reduction in the market returns may show a loss on the year's working. The margin between a living wage and a loss is very fine. To be successful, the financial side must be studied, and marketing the produce must be given as careful consideration as the cultivation of good crops of perfect vegetables.

Little remains to be written by way of introduction. The reader may rely upon it that only methods of cultivation which have proved useful have been written here, and the author believes that those who use this book will find in it much of practical use for the purpose of obtaining bigger crops of fine vegetables.

The vegetables have been dealt with in alphabetical order, with the exception of those which are not very largely grown.

These have been given a single chapter under the title of Lesser Grown Vegetables.

The omission of cucumbers and tomatoes from this work is intentional. To deal with these two vegetables thoroughly would require a large amount of space, and there are two excellent books on the subject published by Messrs Ernest Benn Limited.

Under the circumstances, therefore, it was thought desirable to deal thoroughly with the large class of vegetables which, apart from forcing, are altogether grown in the open air, and not to touch upon those which are in part at least glass-house crops.

CHAPTER I. ARTICHOKES

§ GLOBE ARTICHOKES

GENERAL CULTIVATION

THE globe artichoke will grow on most kinds of soil, but the best results are only obtained on a good, deep loam, and it is not suitable for planting in the shade.

The value of this plant as a vegetable lies in its flower heads which, if properly cooked at the right time, form a very appetising dish.

Soil on which this vegetable is to be grown should be deeply worked and well manured in the autumn. The globe artichoke will fail altogether on soils which are badly drained.

There are two methods of raising a crop. The first is by seeds which so often does not give satisfactory results that it is a method which is to-day very seldom followed. The more usual practice is to plant suckers which are not difficult to obtain. Suckers should be planted out during April. The suckers chosen should not be more than 10 or 11 inches in height and should have as many roots as possible attached. These may be taken during November, in which case they should be placed in boxes and stood in ashes in a frame until planting time, or they may be taken just before they are wanted for planting.

The suckers should be planted about 4 inches deep. There is some difference of opinion among growers as to the distance of the rows apart and the distance of the plants in the rows. Some growers place the rows 4 feet apart, allowing the plants to stand 2 feet apart in the rows, while other growers prefer

the rows 3 feet apart and the plants 3 feet apart in the rows. Both methods give equally satisfactory results.

If the weather is dry, watering will be necessary, and if this is supplemented with applications of weak liquid manure, better results will be obtained.

Firmness of the soil is essential for the production of good heads, and for this reason the suckers should be well trodden down when planting.

It is also important that the soil be kept clean, so that constant hoeing is necessary.

HARVESTING

All heads forming at the side should be removed before they are large enough to tax the strength of the plants, and main heads should be removed as soon as they are well formed.

In the ordinary way the heads are cut without a stalk, or with a very short stalk; but if for any reason it is desired to keep them for some time, they should be cut with as long a stem as possible and stood in water in a cool, shady place, the stem being shortened from time to time as it decays. By this means the heads may be kept in good condition for a long time. If left on the plants they will not keep in such good condition.

On certain soils, especially those which specially suit the production of good quality heads, these plants are very subject to damage during a severe winter, and protection should be given.

The best means of providing protection is to earth up to some extent the plants with the aid of earth taken from between the rows, and as an additional precaution, sprinkle a quantity of dry litter over the bed. The latter should be removed as soon as all danger of damage by frost is over.

Properly looked after, a plantation will last about four years. On specially suitable soils it may remain productive for about a year longer than this, while on unsuitable soils three years will probably prove to be the limit.

PROPAGATING BY SEEDS

If it is decided to propagate by means of seeds, the soil should be thoroughly prepared and drilling should take place

during March or April. the drills being about 14 or 15 inches apart. The young plants should be thinned to about 6 or 8 inches. In a year from the time of sowing they will be ready to move to the permanent beds.

§ CHARDS

This is simply a name given to other parts of the globe artichoke. In July the artichokes are cut down close to the ground, and plentiful supplies of water are given.

§ JERUSALEM ARTICHOKE

GENERAL CULTIVATION

Unlike the globe artichoke, it is the roots of Jerusalem artichokes which are popular as a vegetable, although there is a section of the public to whom this vegetable does not appeal.

The Jerusalem artichoke, which is a member of the sunflower family, will grow satisfactorily on almost any kind of soil.

For the production of Jerusalem artichokes of fine quality, preparation should be made as early in January or February as weather conditions permit.

A good dressing of manure should be applied, and the land should be deeply dug. Tubers should be planted during March, the rows being about 3 feet apart, and the roots about 18 inches apart in the rows.

HARVESTING

Jerusalem artichokes should not be lifted for use until the tops have died. They may with advantage be left in the soil until they are wanted for use, but if this is not convenient they should be lifted and stored in sand.

It is essential that the land be thoroughly dug after this crop, as small pieces of root, if left in the ground, will grow.

MANURING

The most suitable fertilisers are sulphate of potash and superphosphate, in the proportion of two parts of the former to three of the latter. About 5 or 6 ounces per square yard will be a suitable dressing.

§ CHINESE ARTICHOKE

GENERAL CULTIVATION

It was at one time thought that the Chinese artichoke had come to take a popular place among vegetables ; that it would, in fact, become as popular as the globe or Jerusalem varieties. This has not been the case. It is, however, sufficiently largely grown to need notice here, especially as certain vegetables, like most other things, have a knack of making no progress for a time and then suddenly taking the fancy of the public.

The Chinese artichoke likes a good, light loam which should, when being prepared for the crop, receive a thorough dressing of manure. It does not do well on heavy or on clay soils.

Tubers should be planted during the last fortnight in March or the first week or two in April. The rows should be from $1\frac{1}{2}$ to 2 feet apart, and the tubers about 12 inches apart in the rows.

They may be planted by means of a dibber, but it is better to plant in trenches, which should be of such depth that when filled in the tubers are covered with 3 or 4 inches of soil.

When the tubers are ready for lifting, which will be in the autumn, they may be stored in the same way as the Jerusalem artichoke.

CHAPTER II. ASPARAGUS

§ ASPARAGUS

GENERAL CULTIVATION

It is widely believed that asparagus can only be successfully grown on one or two kinds of soil, and that to attempt to cultivate this vegetable on other kinds of land is useless.

This is a fallacy. There are few soils on which asparagus may not, given proper treatment, be grown with success. It is true that the expense of cultivating and getting into good condition those soils which are least suitable will be greatest, but even here the expense is not usually such that the cultivation of this crop becomes unprofitable.

Asparagus may be grown from seed, or the young plants may be purchased and planted. Whichever method is adopted, it will be two or three years before the vegetable is fit for use; but while a saving of time results from the purchase of young plants, the essential expense is smaller if the necessary plants are grown from seed.

Before sowing the seed it is necessary to prepare a bed for the purpose. Thoroughness here is important. In fact, with everything to do with asparagus, thorough preparation is more than half the secret of success.

The soil should be deeply dug or trenched, and a plentiful supply of farmyard manure should be worked in.

Having worked the soil to a fine tilth, drills should be drawn out 1 inch deep and about 10 inches or a foot apart. In these the seed should be thinly sown.

April is the best month for sowing asparagus seed in the manner described.

It is necessary as soon as the seedlings have attained a size when they may safely be handled, to thin them out to a distance of about 12 or 14 inches apart. The plants which remain will then be ready for planting in their permanent position after the second year.

Should it be decided to sow the seed directly on the permanent bed, rather different treatment will be necessary.

First of all it will be necessary to decide on the size of the beds, also whether these are to be raised or not. It may be pointed out that given really first class asparagus soil, that is a nice workable loam which is either naturally or artificially thoroughly drained, a raised bed is not important; but failing such a soil, particularly on heavy damp lands where drainage is difficult, raised beds are essential.

In either case the beds should be well prepared for the permanent plantation and not just for a seed bed to hold the plants for a year or two.

The young plants will need thinning out, and this should be done as early as possible, a space of 7 or 8 inches being allowed between the plants. The plants will still be far too much crowded, but a further thinning should be carried out early the following year.

If the seed is sown in the permanent bed, the whole of the beds will be more or less idle for three or four years, as the asparagus will be this length of time before it is fit to cut, and apart from one or two catch crops, no other use can be made of the land. This is one of the advantages of sowing the seed on a special seed bed.

The beds on which the asparagus is to be grown may vary in size, or the asparagus may be grown in rows. Beds are, however, an advantage; but they should never be too wide, or it will be difficult to cut the asparagus in the middle of the bed without doing damage by treading on plants at the side.

Apart from the fact that this vegetable may be grown on the flat, or on raised beds, preparation is practically the same in each case. The raised bed makes it possible to grow this crop on soil on which it would otherwise be impossible to cultivate it successfully. For one thing, the drainage is improved and also a greater depth of soil is available for the plants if raised beds are employed.

Whichever method is used, deep digging is important, as for the seed bed. If the soil is altogether unsuitable, it may be necessary to remove the top layer to a depth of several inches and to make up a compost of a more suitable nature on which the asparagus will thrive. This compost should contain a proportion of lime and leaf mould, together with some sand.

Whether or not a special compost is prepared, some manure should be worked in, and, in addition, it will be necessary, or at least advisable, to top dress each year. While it is true that asparagus may be grown on a seed bed, to be transplanted at the proper time, it should be remembered that the plants should not be taken up until every preparation is made for replanting them in their new quarters, for these plants suffer rather more than most if they are left exposed to air for any length of time.

The method of planting is simple. Whether the beds are flat or raised, it is best to plant the young plants on mounds or ridges, the latter being the most usual method among market gardeners.

There should be about a foot and a half between the ridges, and 9 inches from the edge of the beds. On these ridges the asparagus is placed, the roots being at least a foot and a half apart if heads of good quality are desired. Although some growers plant a few inches closer than this, it is not advisable to do so.

After the roots are in position, the earth is replaced, covering the roots to a depth of 5 or 6 inches. The best time to plant is when growth is just commencing. This is usually during the last fortnight in March or the first fortnight in April; but the time varies to some extent with the situation of the bed.

The general cultivation of asparagus is not difficult if the necessary operations are carried out regularly at the proper time. It is always necessary to keep the soil free from weeds.

Certain of the plants will probably fail to grow, and where it is noticed that they are missing, these should be replaced. Nothing takes more quickly from the profits than does gaps in the beds when the plants are ready to cut.

The plants should be cut down in the autumn before they begin to seed, and in order to destroy any injurious insects which may be present it is best to burn the tops as soon as possible.

Similar treatment should be carried out the following year. It is best at an early stage to place stakes in position so that those who have to work at cleaning the beds when there is no growth visible may know exactly where the plants are to be found.

After the plants have been cut down, give the beds, if possible, a good dressing of half-decayed manure. This dressing will

need to be cleared away during the last fortnight in February or the first fortnight in March. The application of salt may serve a useful purpose, but it is not an unmixed blessing. If salt is applied, the application should not be made until growth has begun. Later dressings of salt are more likely to do good than are dressings made too early.

BLANCHING

Some growers prefer to market their asparagus green others prefer to cater for that larger public which prefer blanched asparagus.

There is more than one method of blanching asparagus, but for the market grower the simplest method which does the work efficiently is usually the most satisfactory.

If soil of a not too heavy texture is heaped over the plants blanching will be carried out quite naturally and without any great expense.

FORCING

Forced asparagus, like most choice vegetables obtainable out of season, is always in good demand. Like most other vegetables also, a little trouble and expense is necessary if good results are desired.

For the market grower elaborate systems of forcing are neither necessary nor desirable, and the most suitable methods are to force the asparagus in the permanent beds or on hot beds. The advantage of forcing in the permanent beds is a big one. Asparagus forced in this way will be of use in following years, but if a system of forcing is followed which necessitates the roots being lifted and moved, the roots, after forcing, are of no further value, so that the amount of waste where any such method is practised is great, and must add considerably to the cost of production.

There are two methods of forcing asparagus in beds, one by means of fermenting manure, the other by means of hot water pipes; and for the market grower, unless he is in a very big way of business, the former is usually most satisfactory. It is advisable that beds which are intended for forcing should be made to a suitable size so that the frames to be used may fit reasonably well. A useful width for the beds is from 4 to 5 feet, and the alleys between should be at least 2 feet wide and a foot and a half in depth.

Three or four rows of plants are mostly planted in each bed. The distance between the plants is from 8 to 10 inches.

The frames are placed on the beds when it is desired to begin forcing. This is generally early in January. At the same time 2 or 3 inches of fine soil should be spread over the beds and fermenting manure placed in the alleys and all round the frames, practically to the top of these.

Some growers place the lights on the frames and cover these with mats at once. Others prefer to leave off the lights and mats until the shoots begin to show. Lights and mats are then placed on the frames, and the fermenting material is removed. Both of these methods have been found to give satisfactory results.

With the employment of fermenting material the greatest difficulty will be the control of the temperature. This sometimes runs up too rapidly and at others it cools before cutting is finished. Should it be found to be heating too rapidly, a slight amount of the heating material should be removed, or the asparagus produced, although of good appearance, will be flavourless. On the other hand, if the fermenting material cools too rapidly, a part must be removed and replaced with a fresh supply; by this means it should be possible to more or less control the temperature.

If possible, growth should commence at between 50 and 60 degrees, and the temperature be permitted to rise gradually until between 65 and 70 degrees is attained. This should be the highest temperature allowed.

Although it is not possible to force the same beds each year, this method does save the grower from any necessity of obtaining fresh roots every time it is desired to force. The same bed may be repeatedly forced if a year is missed after each forcing.

The hot water method, although a little more expensive at first, is considered by many more satisfactory, because where hot water pipes are employed, perfect heat control is possible.

Forcing on hot beds in frames is largely favoured by a large number of market growers, and is certainly the method most often used in private gardens. A mixture of rather long manure and leaves is most suitable, as this holds the heat better than does manure alone.

The bed should be well trodden down; it should be from 2 to 3 feet thick, and should be covered with about 4 inches

of leaf mould, after which the frames may be placed on the beds. Roots, which should be specially grown for the purpose, will need replacing every year, as by this method of forcing they are rendered quite useless for further planting. Roots are placed very closely together on the soil, and covered to a depth of 4 or 5 inches. The frame should be kept closed at first, but after a few days it should be slightly opened and still more air may be admitted.

It will be necessary to water fairly regularly plants grown in this way. The water used should not be warm, but if the air is off it will be better than watering with cold water.

Asparagus may also be forced in pits or in greenhouses. In any case the method is the same, the best result being obtained if the temperature at which forcing is commenced is not too high.

PRODUCTION OF LARGE STICKS

There is a market for large sticks of asparagus, and some growers desire to cater for such markets. It is not difficult to obtain sticks of extra fine size which are also of good quality.

A deep trench is dug out, about 2 feet 6 inches in depth. This is nearly half-filled with a very light vegetable compost on which has been placed 4 or 5 inches of good loam.

At least 3 feet should be allowed between the plants which are put on this, and they should be covered with 3 or 4 inches of good soil.

It is advisable to plant only specially selected roots if giant asparagus is desired, and after planting, a mixture of superphosphate and sulphate of potash may be sprinkled over the soil in the proportion of three parts of the former to one of the latter. The amount to be used is about 4 cwt. per acre.

A stake should be placed at each end of the row. It is sometimes the practice to plant asparagus intended to produce extra fine sticks in triangular clusters of three, allowing at least 2 feet from root to root and about 2 yards between the clusters; but there is no real advantage in this arrangement.

HARVESTING

Unless care is exercised in harvesting this crop, a good deal of damage may be done, and the amount of asparagus available

for market may be lessened considerably, as heads which are not through the soil will be broken off and rendered useless.

Knives made specially for the work are available, and if these are pushed well into the soil, near the head it is intended to cut, in a somewhat oblique manner the head may be cut without damage to those near it. A certain amount of experience is necessary to become expert. Thin and thick heads should be cut so that those which are to follow may obtain all possible nourishment from the roots.

Some growers prefer to break off the shoots instead of cutting them. This is largely the case with asparagus which has been forced.

The asparagus harvest usually finishes about the 21st of June. It is inadvisable to continue for many days longer than this, or the crop for the following season will be damaged.

GRADING AND PACKING

Having gathered the asparagus, it will need grading; that is, all thin sticks should be separated from those of reasonable thickness.

There are many ways of packing, and the bundle which appeals to one market may find no favour in another. The main difference is in the number of heads in each bundle.

It is important to see that the heads are level and the bottoms nicely trimmed. Packing may be done quickly and evenly by means of the wooden apparatus made for the purpose.

VARIETIES

This is a matter of little importance, as if good quality roots are obtained, all will give almost equally good results.

PESTS AND DISEASES

Although asparagus is not very subject to attack by either pests or diseases, in certain seasons the crop does suffer to a greater or lesser degree.

Among the worst of the troubles to which asparagus is subject is attack by the asparagus beetle. The beetles are about $\frac{1}{4}$ inch long, blue-black in colour, with yellow or orange markings. The eggs are laid on the leaves or stems

during June, or later, and the grubs which hatch out of these eggs devour the leaves. Two and sometimes three broods are hatched each season, and as one beetle lays a great number of eggs, it can easily be understood that the damage which this pest causes at times is very serious.

If beetles are noticed on the plantation in too great numbers, the most effective remedy is to wait until cutting is finished and then to spray with arsenate of lead. As this wash is very poisonous, it must not be used while cutting is in progress.

The asparagus fly does not usually cause serious loss to the grower. It is first seen during the early part of May, and the eggs are laid on young shoots. The maggots which are hatched from the eggs feed upon the young shoots, and render them useless and distorted. All shoots suspected of containing these maggots should, in August, be cut down and burned.

The asparagus root disease also attacks clover, and when an attack occurs the injured roots die. All affected roots should be dug out of the plantation and burned.

Asparagus rust is a far more serious disease than that just mentioned, and in certain districts it is at times the cause of heavy loss to the grower. Shoots attacked by this disease turn black and die. This disease does not usually make its appearance during a dry season, but during seasons of heavy rainfall, loss from this cause is likely to be serious in those districts in which it is most liable to make its appearance.

INSTITUTION

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Pinching out the Tops of Broad Beans to encourage the pods to fill
as well as to prevent attack by Black Fly.

CHAPTER III. BEANS

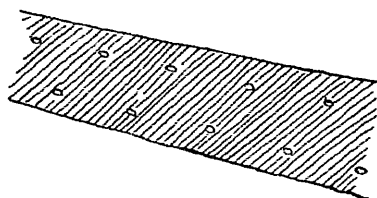
§ THE BROAD BEAN

GENERAL CULTIVATION

SEVERAL varieties of the bean are largely grown as market garden crops. Some are more difficult to cultivate successfully than are others.

The broad bean may, with a little trouble, be grown to produce excellent crops. Most kinds of soil are suitable, but whatever kind is available it should be given a thorough dressing of manure, and it should also be deeply cultivated when being prepared for the seed. This is most important if the best results are desired.

The broad bean has the advantage of being thoroughly hardy, and as it occupies the ground for only a short time, it is generally considered one of the most profitable crops from the point of view of the market grower.



Method of sowing Broad Beans
in double rows.

The main crop should be sown in the position it is to occupy during February or March. Successional sowings may be made up to a month later than this. The seed is sown in single or double rows. If double rows are favoured, each pair of rows should be from 2 to 4 feet distant from the next pair, the former distance being the one most usually adopted. Each of the double rows should be from 6 to 10 inches from its companion, dwarf varieties being planted the smaller distance. When the beans have grown to a height of 7 or 8 inches, a little soil should be carefully drawn round them with a hoe.

Many growers pinch out the tops of the plants after they are well in flower to prevent attack by black fly, and although there are experts who suggest that no beneficial results follow this operation, we are strongly inclined to favour it, and certainly

nothing but good can result from this practice, as it helps the pods to mature more rapidly.

The tops which are pinched off should be dropped into baskets and carried off the garden or field.

EARLY CROPS AND FORCING

For early crops the long pod varieties are the most suitable for sowing during October or November. Sowing beans during these months, although it may be carried out with success, is a method which has largely gone out of practice.

A method which gives equally early crops, and which is more certain of giving results, is to sow the seed in boxes or pots during January. These should be given the protection of a frame or a cold pit or greenhouse which is secure from frost, or they may be grown in slight heat. Plants grown in this manner will need gradually hardening off, and they may be carefully planted out during March.

By this means a full plant of healthy beans should be obtained which, if given a sheltered position, will produce very early crops. Later sowings may be made towards the end of January and treated in the same way.

HARVESTING

When the beans are ready for gathering, the harvesting should be done with the greatest care, as if carelessly carried out a much smaller crop than usual will be produced.

It is the occasional practice of growers to cut down the main crop to within a few inches of the ground after the beans have finished yielding. If kept well supplied with moisture, the plants will grow again and produce a crop of medium quality beans.

A great drawback to this plan is that if left too long in the ground these beans take a good deal of nourishment from the soil, and gradually exhaust it. For this reason alone this method is not recommended.

Broad beans are sometimes planted so that they form a sheltering crop for other less hardy vegetables.

EXHIBITION

For exhibition purposes broad beans should be grown in trenches prepared in the same way as those used for celery.

Several inches of rotten manure is placed in the bottom of each trench with about 5 inches of soil on the top of this.

Early varieties should be sown in boxes first and then transplanted to the trenches, allowing plenty of space for development. Those that look the most promising should be tied to stakes, and when the pods are formed, all except about half a dozen of those likely to be useful should be removed.

Plants from which a selection should be made should receive frequent applications of liquid manure.

Long, straight, even pods are most suitable for the purpose, and they should be gathered as late as circumstances allow, as deterioration takes place within a very short time.

MANURES

In addition to a heavy application of farmyard or stable manure, artificial fertilisers are often used with great benefit. The most useful fertilisers for this purpose are those containing phosphates, as well as basic slag and perhaps kainit.

Nitrate of soda, although not often necessary, is useful on some soils, and may with advantage be applied where wanted; but it is a fertiliser which on soils of average quality should not be needed.

If the taller varieties are grown, support is sometimes given, and, where possible, it is an advantage if this can be done.

Before sowing it is always advisable to soak the seed in water for about a day, as this helps forward germination to a considerable extent.

VARIETIES

There are many useful varieties of the broad bean, some being suited to one kind of soil, while other varieties do better on soils of other nature.

The Early Mazagan, although it does well when sown in November, is not one of the most useful varieties to grow. An improvement on this type is the Leviathan. As has been previously stated, the long pod varieties are most suitable for early growing. Other useful long pods in addition to the Leviathan are Nettleship's Prize, Exhibition Long Pod, the Green Giant, and the Aquadulie.

The last is an improvement on the Seville Long Pod, the pods being mostly over a foot in length and 2 inches broad. It does

not, however, bear a large number of pods to each stem, four or five being the most that are usually produced.

Among the Windsor varieties the Green Windsor, the Giant Windsor, and the Little Marvel may be mentioned.

PESTS AND DISEASES

Among pests which attack broad beans, the black fly has already been mentioned, as has the best method of protecting beans from attack by pinching out the tops of the plants after they are showing sufficient flower to produce a good crop.

Other names by which the black fly is known are the bean aphid, the black dolphin, the dolphin fly, and the collier.

Eggs are deposited in the autumn on to thistles and docks by oviparous females. A few months later these eggs hatch out into another kind of female known as viviparous, which are called mother queens. These females in turn give birth to live lice, and it is through these lice that the damage is done to the plants. They suck the sap from the plants and cover them with honey dew after causing very serious loss.

In addition to taking the precautionary measures already described, it is very important to keep land in the neighbourhood clear of thistles and docks, not only when the beans are growing but during the preceding autumn.

If in spite of these precautions the crop is attacked, it will be necessary to spray with a mixture of soft soap and paraffin, the mixture being used in the following proportion, a smaller or larger quantity being employed according to the size of the crop: 1 lb. of soft soap should be boiled in 4 gallons of water until it is dissolved. To this should be added a teacupful of paraffin. The mixture should be thoroughly stirred, but spraying should not be carried out until the wash is cold. Two sprayings will probably be necessary to destroy the pest, but it should not be necessary to spray a third time.

HUMBLE BEES.—Although humble bees are very useful insects, especially to fruit growers, in their anxiety to obtain honey they occasionally do damage to broad beans. The injury prevents pods forming, and is caused by the bees boring holes in the calyces.

The only remedy is to destroy the bees, but as the damage which they do is not usually serious, although now and again it

assumes large proportions, and as these bees are very useful for fertilising every kind of plant, it is usually advisable to ignore the comparatively slight injury which they inflict upon this crop.

BEAN RUST.—A disease which attacks not only broad beans but French and runner beans; also is known as the bean and pea rust. Weak, unhealthy growth results from attack by this disease, and consequently the crop suffers sometimes very considerably.

There is no remedy for this disease, which may be known by the white-coloured spots appearing on the plants, but it will help to prevent the spread of this disease if affected leaves and stems are collected and burned as soon as its presence is noticed. Unfortunately this is not always possible when beans are grown on a large scale.

THE BEAN SEED BEETLE.—Seeds of beans are often destroyed by this pest, the maggots of which feed on the young beans, and so render them useless. The eggs of this beetle are laid in the flowers of the plant, and, when hatched, whitish maggots are to be seen. It is these maggots which are the cause of the damage. The beetle itself is black in colour, and small.

§ THE DWARF BEAN

GENERAL CULTIVATION

Other names by which this class of bean is known are the kidney bean or the French bean. Dwarf beans are a little more particular as to soil than are broad beans.

They do best on a productive light soil, but will grow on most land of good quality.

Whether the soil be light and rich or whether it be only moderately suitable for this crop, good cultivation will be very well repaid to the grower, especially if a reasonable dressing of manure is also applied to the soil at the same time. The better condition the soil is in, the better will be the crops, and it is advisable, if at all possible, to fork the ground over several times.

Dwarf beans are by no means hardy, so that the main crop should not be sown when there is any danger of frost, as the slightest touch of this will ruin the crop.

May and June are the most suitable months for sowing this

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crop, although the seed may with reasonable hope of success be sown during the last fortnight in April.

In the South, sowings may take place earlier than in the North.

The distance apart which the rows of dwarf beans should be will vary with the strength of growth of the variety planted. If intercropping is practised, this will also make a difference.

The rows or drills will be from 18 inches to 2 feet apart, if no other crops are planted between. If other crops are grown with the beans, the distance of the rows or drills apart should be from 2 feet 6 inches to 3 feet.

Both spring cabbage and cos lettuce are useful for planting between the earliest sowings, as they will shelter the young beans, and at the same time they do not occupy the soil for a very long period.

The distance of the beans apart in the rows will also vary to some extent, from 6 to 12 inches being suitable, according to the variety grown. The seed should, however, be sown more thickly than this, between 2 and 4 inches being suitable, and the surplus plants should be chopped out as soon as they are large enough. This will ensure that there are no big gaps in the plant. At the same time, it is not advisable to neglect thinning the plants as soon as they are ready, as by doing so the crop will be ruined, or at least badly damaged. Nothing causes weakly growth more quickly than does overcrowding.

It is a usual practice to sow the seed in drills about 4 or 5 inches wide, planting a double row of seed in each drill, in which case the seed should be planted so that each seed on one side of the drill falls between two seeds on the other side of the drill.

It is sometimes the practice to dibble the seed in. This is the easiest though not always the most satisfactory method.

The seed should be sown about 2 inches deep, although on very light soils it may be slightly deeper than this.

When the plants are visible the hoe should be kept regularly at work, not only for the purpose of killing weeds but also in order that the soil may be kept in the best possible condition. It is advisable also to slightly mould up the plants, that is, to draw with the hoe some soil up to each side of the row.

During dry weather these beans should be kept well watered, if at all possible. When grown on a large scale it is not always

possible to do this. It is also an advantage if liquid manure can be applied when the pods are forming.

FORCING

If profitable crops are to be obtained from forced dwarf beans, the greatest care must be exercised. Under glass particularly is the production of this crop a task needing great care and skill.

From the time that it is unsafe to sow out of doors, namely, the end of July until the end of September, seed may be sown in frames. A light compost of good, well-manured soil should be used, and the seed sown in rows a foot apart and 3 or 4 inches apart in the rows. Later they should be thinned to 6 inches apart in the rows.

Seeds sown in this way should be well watered. No protection need be given while the nights are warm, but as soon as these become cold, protection should be given.

By somewhat similar treatment a crop may be obtained very much earlier than is possible where the seed is sown in the open.

About the middle of March the seed is sown exactly in the same way in frames. The frames should be kept quite closed until the seed begins to grow, after which the frames should be removed whenever possible without danger of damage.

As the plants grow the frames may be raised; but they should not be removed altogether until the end of May, when danger of frost doing serious damage no longer exists.

For all frame-grown dwarf beans thorough watering is very necessary. During the winter months these beans may be grown in pots in heat, or in heated pits. Probably pot-grown beans will be the most successful.

A rich light compost should be used, and two seeds should be placed in a 3 or 4 inch pot. A temperature of round about 65 degrees is necessary to start the seed growing well, and water should not be given until the young plants are showing through the soil. From this time onwards they should be well watered at regular intervals.

When a few inches high the young plants should be very carefully transplanted singly into larger pots, in which they are to remain until they have finished cropping. The temperature should not at night be allowed to get lower than 55 degrees.

If desired, nine or ten seeds may be sown in 10-inch pots, and when growing nicely about half of the weakest may be removed, the remainder being well watered, and with the aid of liquid manure will produce a good crop without replanting.

By this means all the labour of repotting is saved, and where pots of this size are available without the expense of buying them specially for the purpose, very satisfactory crops may be obtained.

If sowings are made every fortnight or three weeks throughout the winter, a regular supply may be maintained.

Boxes are sometimes used instead of pots.

HARVESTING

Dwarf beans form very quickly, and it is necessary to make repeated gatherings if the beans are to be kept in the most productive condition. Occasionally it may be necessary to go over each row twice in a single week. At all events the pods should not be allowed to get overripe before being gathered, as by doing so any further chance of gathering beans from rows on which this has occurred will be quite spoilt.

If seed is wanted it is a different matter, and the last of the pods may be allowed to remain on for the purpose of ripening.

The plants are pulled up by the roots and spread out thinly on the floor of a shed. Threshing and cleaning should be carried out during the winter.

LATE CROPS

Dwarf beans may be sown out of doors at intervals until the end of July for late use. Unless protection can be given, it is unsafe to sow later than this. As the soil, except in wet seasons, is likely to get hard during this period, it is advisable to soak the seed in water for several hours. Watering should also be thoroughly carried out when the seed is sown.

After sowing, a mulch of rotten manure spread over the soil will do a great deal towards ensuring a successful crop.

EXHIBITION

Beans are like most other vegetables in that if pods of exceptional quality are wanted, ample space for development should be allowed. The rows or drills should be at least 18 inches apart, and the beans should be one foot apart in the rows.

It is most satisfactory to plant two seeds together, a foot apart, and when they have grown an inch or two to thin out the weaker.

Pods should be straight, crisp, long, and not tough or stringy. Between three and four months should be allowed for the production of exhibition pods.

Extra care should be taken in the preparation of the soil, which should be thoroughly dug, and of the best quality available.

A week or two before the show, examine the rows of beans daily, carefully gathering the best and placing in water in a cool place. The pods should be kept upright, and the water changed frequently. If the pods have been gathered some time before the show, a long stalk should be allowed to remain on the pod, and a piece should be cut off from time to time, the pods being then replaced in water.

It should not be forgotten that a good deal of the effect of any vegetable depends upon the care with which it is arranged. Many prizes are lost through lack of thought and care in arrangement.

MANURES

Although well-rotted manure may be worked into the soil to be occupied with dwarf beans with good results, it is far better to sow the seed on land which has been well manured for previous crop.

Under no circumstances should fresh manure be applied to soil on which this crop is to be grown.

If growth is weak, nitrate of soda may, with advantage, be applied. This forcing fertiliser may also be applied when the beans are bearing, but it should be used with the greatest care. Few soils can stand nitrate of soda used year after year, and if it has been used on the same piece of ground the year before or another crop, it should only be applied to the dwarf bean crop in case of real necessity.

Lime applied to the soil before the seed is sown will usually prove very beneficial.

Other fertilisers which may be used with useful results are superphosphate, especially on light soil. It should be applied at the rate of 1 lb. to a row 15 yards in length. On light soils also a potash manure may be used with the superphosphate ;

sulphate of potash may be applied at the rate of $\frac{1}{2}$ lb. for each row 15 yards in length.

The amount of nitrate of soda which should, if necessary, be used, is the same as sulphate of potash.

On soils of a heavy nature it is unlikely that a potash fertiliser will be needed, and it may be advisable in place of the superphosphate to apply a good dressing of basic slag in the winter.

If desired, also sulphate of ammonia may be used instead of the nitrate of soda. It should be used in exactly the same quantities.

VARIETIES

As is the case with most vegetables, there are many useful varieties. Where a certain variety has been tried in any district and on any particular soil, and has given full satisfaction, the grower would be well advised to keep to this variety.

For forcing and for general cultivation, Magnum Bonum, Canadian Wonder, Ne Plus Ultra, and Magpie are useful. Sutton's Superlative is a good early cropper, and Negro is a good late kind.

PESTS AND DISEASES

The dwarf bean is not exempt from attack by the bean aphid, that most serious of all pests which attack beans.

The method of dealing with this pest is fully described under the heading Pests and Diseases in the chapter devoted to the broad bean, to which the reader is referred.

Bean pod canker is a disease which attacks from time to time the dwarf bean. This disease does not occur very frequently, but when it does it attacks both the pods and the stems; when the latter are attacked the upper part of the shoot usually dies. If the pods are attacked they are of no further use for market.

Dark spots with a reddish line round them are the first indication of this disease. In order to prevent attack, spray with $\frac{1}{2}$ ounce of sulphate of potassium to 2 gallons of water. Bordeaux mixture may also be used at half strength, but only if applied before the flowering stage is reached.

Perhaps the best remedy as well as the most certain safeguard against future attack is to pull up all affected plants and burn them. It should be remembered that this disease is often present in the seed when purchased. It is therefore particularly

important that the grower should deal only with a reliable firm.

The dwarf bean sometimes suffers from attack by the red spider. This pest is not likely to be troublesome in wet or cool weather, but during a dry, hot spell it may be the cause of considerable damage, with the result that a much smaller harvest will follow. The remedy, or rather the best preventive, is during a spell of dry weather to give the plants a thorough watering from time to time before the pest makes its appearance.

Bean and pea rust is a disease from which dwarf beans receive damage during certain seasons. Beans which are attacked by this disease show it in the weakness of their growth. With this disease the crop also suffers.

There is no known wash which is effective in preventing or controlling this disease, and when plants are attacked the only way to insure immunity in the future is to uproot and burn all diseased plants.

§ THE RUNNER BEAN

GENERAL CULTIVATION

Runner beans are not difficult to grow, as they will do well on almost any garden soil if properly treated. They, however, pay very well for being well treated with regard to the preparation of the soil and feeding the crop. This is not an unprofitable crop to grow, especially if the beans are pulled when they are at their best.

May is the earliest month that it is safe in this country to grow this bean, as it is less hardy than the dwarf variety. In very cold districts it may be advisable to delay sowing until the first week in June, and in any case a further sowing should be made during this month.

The usual practice is to sow runner beans in rows; sometimes single rows are favoured, sometimes double rows. They may be grown over a wire fence, or some similar support should be favourably situated.

Drills are usually drawn about 3 inches deep, and should it be decided to plant in double rows, these should be 9 inches apart. As for the distance of one pair of rows from the next, this varies considerably from as close as 3 feet between the double rows to 8 feet. It is a mistake too often made to crowd the double

rows too closely together, and there is no need to do this as the space between one pair of rows and the next if sufficient may be utilised for the production of other vegetables.

About 6 feet is a reasonable space to allow, and the soil between may be utilised for the production of lettuces or similar crops.

The seed should be sown fairly thickly, but when the plants are up they should be thinned so that they stand from 10 inches to a foot apart, and so that each plant in one row of the pair is situated between two plants in its fellow row.

STAKING

It is not actually necessary to stake this crop, although it is advisable to do so if at all possible. In order to grow the plants without the aid of stakes, the tops should be well pinched out when a height of between 1 and 2 feet has been reached, and again when further growth has been made. Single rows are advisable if this method is adopted, and these may be about 3 feet apart.

Staking should be carried out early; as soon, in fact, as the plants have reached a height of a few inches. Sticks are put in on either side of the row and cross pieces are tied firmly in the forks of these.

HARVESTING

It is not advisable to wait too long before gathering the fruit of the pods. As soon as they have attained a reasonable size they should be harvested. Too long an interval should not be allowed to elapse before going over the crop again. It is best if they can be gathered at least three times a week.

With most of this class of vegetable, if the crop or a part of it is allowed to get old before being harvested, the plants very soon fail to bear at all; and there is further loss, as if the beans are allowed to get old on the vine they are of no further use for market. As little delay as possible should be allowed between harvesting and marketing, as the beans soon deteriorate. At all events the more quickly they are placed on the market, the fresher they will be.

EXHIBITION

In order to obtain good quality runner beans it is necessary to thin the bunches of pods, leaving only two or three of the

most promising to each bunch. It is also advisable to feed the plants regularly. The points of young shoots should be pinched out, so that the young beans will obtain the greatest amount possible of nourishment.

For show purposes the beans should be of even size and of a healthy colour. If the beans are ready for gathering a few days before the show they should be picked and stood upright in shallow water, the stalk ends being downwards.

The number of pods required varies in different shows.

MANURES

In addition to a thorough dressing of farmyard manure worked into the soil either for a previous crop or some time before planting, there should be applied to the soil also some time before planting about a quarter of a ton of ground lime per acre. Superphosphate may be also used to about half this amount, and sulphate of potash to about half the amount of superphosphate should be all that is necessary to give good results.

On land which is rich in lime this need not be applied.

VARIETIES

There are a large number of really good kinds from which to make a selection. A few of these which have proved themselves may be given for the guidance of those who are inexperienced.

Prizewinner is a heavy cropper of very good quality beans, as are also Best-of-All, Scarlet Emperor, and Red Giant. The well-known Scarlet Runner needs no description. It is likely to hold its own and to be grown for many years to come.

PESTS AND DISEASES

These have all been dealt with under the other varieties of the bean, to which reference should be made.

OTHER BEANS

The Butter or Waxpod bean, Flageolets and Haricot beans are other types of certain of the beans already described, and the treatment is the same as that which has already been set out in detail.

CHAPTER IV. BEET

§ GARDEN BEET

GENERAL CULTIVATION

ALTHOUGH garden beet is not one of the most largely grown vegetables, it is becoming more and more popular on the table, and whilst the demand for this crop may not be heavy, there is always a steady sale for it. For salading also it is keenly appreciated, so that every vegetable grower, if his soil is at all suitable, will feel inclined to devote a part of his garden to this crop.

The most suitable soil is a really light loam, but with thorough preparation many other kinds of soil may be made suitable for the production of profitable crops of good quality beet. The soil should not be manured the same year that the beet is grown on the land, but if it has been manured for a previous crop the beet will benefit. Deep digging is advisable; in fact, unless the soil is well prepared in this way the roots will be badly shaped and uneven in size, with the result that little or no sale will be found for the crop. It is only beet of good quality for which a ready market can be found.

The red-fleshed kinds are most largely cultivated in this country, although in certain districts the black beet is popular, while for those who keep stock one or two of the yellow beets possess exceptionally good feeding qualities. Where grown at all, however, these last are more suitable for field cultivation.

On soils which are at all suitable for the cultivation of beet, the long varieties are usually the most popular. The globe or turnip-rooted kinds may with advantage be grown on strong lands or on soils where the long varieties are little likely to succeed. From a marketing point of view the turnip-rooted kinds are inferior, as they do not sell particularly well, although their quality, if well grown, is good.

For early and late crops they are in greater demand both by the grower and the public, for they do better than the long varieties for this purpose.

The last fortnight in April and the first fortnight in May is the most suitable time for sowing seed for the main crop. The seed should be sown in drills about 2 inches deep, and the rows should be from 1 foot to 18 inches apart, and the beet should stand about 10 inches apart in the row.

As soon as possible thinning should take place, and throughout the whole time that the crop is growing weeds should be kept down; at first by hand weeding and later by hoeing.

On soils which are too strong or heavy to grow the long varieties of beet in the ordinary way, it is possible to grow the varieties by means of a similar process to that used for the production of extra fine parsnips,

By means of a crowbar or some similar implement, holes are made in the soil in the position that each plant is to occupy. These are filled with the most suitable compost available, and the seed is sown in each position, the strongest plant being left in each case should more than one grow.

§ EARLY BEET

As previously stated, the turnip-rooted varieties may be drilled two or three weeks earlier if a warm, sheltered position is available. It is not advisable, however, to drill the seed too early, or frost will do a considerable amount of damage.

Early sowings will need protection from birds. They should be treated in an exactly similar manner to the main crop.

These varieties may also be sown either broadcast or in drills for a late crop during July. Garden beet may also be forced in frames on a mild hot bed.

About 18 inches of the most suitable soil available will be required.

Sowings on these prepared beds may be made during January, February, and March. The seed should be sown in drills about 10 inches or 1 foot apart, and the young plants thinned to about 9 inches apart as soon as it is possible to handle them.

Air should be admitted as freely as possible, and water also should be given. It may be mentioned here that to water plants grown in the open in the garden is of little use.

HARVESTING AND STORING

Beet may easily be damaged while the crop is being lifted, unless the greatest care is exercised. The most important point is not to damage the roots so that they bleed, and for this reason the tops should not be cut off too low down. Some market growers prefer to break off the tops by twisting.

It is advisable to lift the crop before there is any likelihood of a severe frost, as the roots are very tender. If it is found impossible to do this, the bed should be protected by means of litter so that the crop is not damaged during a sharp spell.

Beet may be stored in clamps and covered with straw and earth, or, better still, it may be stored in sand or earth in a dry shed through which frost cannot penetrate.

MANURING

Although beet should not be planted on soil which has been newly manured, it will repay careful feeding.

Among the fertilisers suitable for this crop are superphosphates and kainit. Sulphate of potash may be used with the superphosphate, if desired, at the rate of two parts of the former to one of the latter. Nitrate of soda is also at times beneficial; but this must be used with the greatest care, not more than 1 ounce to the square yard being employed, and then only on poor soil.

VARIETIES

There is a wide choice of varieties from which to select; many of these are about equal, so far as quality goes.

Large blood-red beet is a favourite in France. It is a good quality beet for the table, yields good crops, and, above all, can stand a certain amount of frost without injury; Dell's Crimson Dwarf is another good kind, as is also Nutting's Dwarf Red. This is a market favourite, as it is evenly shaped, and neither overcoarse nor large; Black Queen beet differs somewhat in shape from those so far mentioned, resembling to some extent a pear. It is a black beet which is also somewhat ornamental.

Among turnip-shaped varieties, Red Globe or Egyptian Eclipse and Early Flat Bassano are among the most useful varieties.

PESTS AND DISEASES

Although garden beet is not as subject to attack by pests and diseases as are many other vegetables, it is not altogether free from attack, the result of which is occasionally serious.

The maggot of the beet fly is sometimes responsible for a good deal of injury to the leaves of the crop, with the result that the roots fail to get nourishment, and a poor crop results.

Eggs are laid on the under sides of the leaves, and at least two broods are hatched in a year. Healthy plants are better able to resist attack than are weak plants, and the best preventive is to give the crops every attention so that strong growth results.

The grubs of the beet beetle also do a good deal of damage to beet leaves. The grubs are dark shiny creatures, not quite $\frac{1}{2}$ inch long, and like the maggot of the beet fly they rob the plant of nourishment. A soil fumigant dug in during the autumn will do a good deal of good.

Beet rust is sometimes responsible for poor crops, as it prevents the plants from making proper headway. All attacked leaves should be burned at the time of harvesting the crop.

Both wireworm and the leather jacket grub are at times responsible to the beet grower for loss. They are also the cause of damage to a great many other crops of every description.

§ SUGAR BEET

GENERAL CULTIVATION

Within the last few years the cultivation of sugar beet has made rapid strides, particularly in this country.

It is a field crop rather than a garden crop, but its importance is such that the market grower will often devote one or several acres, should the land be available, for the cultivation of this crop.

There are likely to be changes in the popularity of sugar beet on the holding, and it is difficult to foresee the future; but it is firmly believed that this crop will hold its own at least for some years to come.

Sugar beet may successfully be grown on several different soils; but the soil on which the most favourable results are likely to be obtained is a medium loam of good quality.

This beet will not thrive in badly drained soils or in soils which are in bad condition, and these faults, if they exist, should be remedied before any attempt is made to grow this crop.

Thorough preparation is necessary, and if manure is applied to the land this should be done in the autumn. If the soil has received a good dressing of manure for a crop the previous season, it will be better not to manure for the beet.

The beet is drilled from the second week in April until about the same time in May. Most soils will benefit if they are rolled before and after drilling, and usually a better plant will result if this is carried out.

In England 18 inches is the distance usually used for the rows apart; but in those countries in Europe in which the experiment has been tried, 16 inches has been found to answer better in every way, and the experiment is worth trying here. Some growers drill their seed even closer than this, but it is not advisable to do so.

Ridge drilling is not recommended for many reasons, the chief being that a part of the top of the beet is exposed and is rendered useless.

Sugar beet should not be drilled too deeply, a depth of from $\frac{1}{2}$ to 1 inch being sufficient.

There are many special implements made for the cultivation of this crop. These are not likely to be needed on the acreage which will be available on the market garden. Hoeing should be commenced as soon as possible; as soon as the first four leaves are visible, chopping out should commence: 7-inch hoes are usually used for this purpose. Singling may be done by hand or by means of the hoe. In Europe, hand singling is general, and the best plant in each bunch is left in the ground; where a hoe is used for this purpose it is not always possible to do this.

HARVESTING

Sugar beet should be harvested during October or November, or at the latest the middle of December. A lower sugar content will always result if sugar beet is harvested later than this.

Care should be taken not to damage the roots when lifting, and after they are lifted they should not be exposed to severe frost.

Topping is work which necessitates a certain amount of skill, otherwise the grower is the loser.

PESTS AND DISEASES

Among pests and diseases which attack the sugar beet crop, the beet carrion beetle, wireworm, and rust have already been dealt with under Garden Beet.

The beet eelworm is probably the most serious pest with which the cultivator of this crop may have to contend. The young roots are attacked, causing swellings, and the root is finally destroyed.

There is no definite remedy for this pest, but liming is usually beneficial. On soil which is subject to attack, this crop should not be grown too frequently.

Aphis is sometimes responsible for a certain amount of damage; but usually the injury caused by this pest is not serious.

Mangold fly is also troublesome at times, and the most effective way of dealing with this pest is by means of thorough cultivation.

§ SEAKALE BEET

GENERAL CULTIVATION

Unlike the different kinds of beet so far dealt with, seakale beet is cultivated for its leaves. This variety needs good soil. The soil should be prepared during March, and sowings should be made about April or May. Drills should be drawn about 18 inches apart and between 1 and 2 inches deep. When the plants are big enough to handle they should be thinned to about 14 inches apart in the row.

Hoeing should be thorough and regular, and, if necessary, watering will be an advantage, as will also an application of liquid manure from time to time.

The mistake most frequently made with this vegetable is to cut off the leaves. They should be pulled off.

The beet should be ready during the autumn.

CHAPTER V. BORECOLE. *See KALE*

§ BROCCOLI

GENERAL CULTIVATION

THE importance of this vegetable to the market grower or to the private gardener for that matter is too well known to need emphasising. It provides the table with a vegetable equal to the cauliflower at a time of the year when this is not obtainable. The fact that it is in season during that part of the year when few other vegetables are obtainable adds considerably to its value, as does also the long period, extending over several months, during which it is obtainable.

It will do well on a wide variety of soils if thorough preparation is made. Most kinds prefer that the soil be on the heavy side, and in any case firmness is essential if the best quality vegetables are desired. An overrich soil is not as suitable for broccoli as is a good quality clayey soil of medium richness. The result of too great richness in the soil is that the plants will be unable to stand severe frost. On the other hand, the soil should not be too poor.

A dressing of manure when preparing the land for this crop will usually prove beneficial. Most vegetables of this class can stand any amount of farmyard or stable manure, but the broccoli is sometimes an exception. On rich soils farmyard manure should be left out of the preparatory work. It may be grown better on such soils without the aid of manure.

On light land it will be found necessary to roll the soil on which broccoli is to be planted.

Broccoli is a very suitable crop to follow strawberries which have been ploughed in. It also does well after peas, beans, or early potatoes.

Seed should be sown on beds prepared for the purpose, and the young plants planted in their permanent positions later. It is important that the seed beds should be well prepared so that the young plants may be sturdy and healthy, otherwise a successful crop can scarcely result.

Drills should be shallow, and the seed will need protecting from birds, which, if this is not done, may be the cause of considerable loss.

Seed should be drilled during April, although a fortnight early or later than this will not be unsuitable, if more convenient. The earlier sowings will be ready for autumn use, while the main crop will be ready during winter and spring. A very late sowing may be made in May for summer use, if desired.

As soon as they are big enough to handle, the young plants should be thinned out, and the young plants which remain may, with advantage, be planted out a little later than this on to a nursery bed. They should be planted about 4 inches apart, and should remain here until their permanent quarters are ready. It should be understood that while it is most advisable, it is not essential that the plants be twice planted out.

As soon as large enough, the young plants should be planted in their permanent positions. This will usually be during June or July. The distance apart of the plants and the rows will vary, and will depend not only on the variety but to some extent upon the season during which the plants are wanted.

If they are required to stand out during the greater part of the winter, they are usually planted somewhat closer together, so that they may to some extent protect one another from a severe spell of weather.

The rows are usually from 2 feet to 2 feet 6 inches apart, the latter distance being the one mostly favoured.

A great many growers plant 2 feet 6 inches apart each way. For the smaller varieties which have to stand severe weather, however, a distance of 18 inches apart in the row is sufficient, and for several other varieties 2 feet will be found to be ample. On soils which are very suitable for this crop a slightly greater distance should be allowed in the rows.

If the plants can be moved to their permanent positions when the weather is suitable, they will get away and make a much better show than if they have to be moved during unsuitable weather conditions.

Dull weather with frequent showers is the most suitable, and planting out during such weather is a simple matter, if the earth is pressed down very firmly indeed round the young plants at the time of planting.

An iron bar will be found of assistance in planting if the

ground is very hard. If there has been a long spell of dry weather before planting, the ground should be thoroughly well watered and the plants puddled in, always taking care to press the soil firmly round them.

Watering after planting is sometimes a necessary evil. It is far better to wait a week or two for suitable weather than to plant during a very dry spell, because plants which are planted when the weather is favourable will usually catch up with those planted during a dry spell, even though they are planted a week or two later.

Both seed beds and permanent beds on which this crop is grown should be kept clean by means of hoeing from time to time. This will not only keep the beds free from weeds, but will also keep them in good condition.

WINTER PROTECTION

Some growers take no steps to safeguard their crop during severe weather, relying upon the hardiness of the plants to escape injury.

During a very severe spell, however, damage is likely to result unless some means of protection is provided. Litter spread over the plants is an effective means of protecting these, if care is taken to remove the litter during wet weather.

Heeling in is also largely practised, although it is generally realised that plants which are undisturbed will give better results.

Carefully carried out heeling in will disturb the plants only very slightly. A trench is dug out on the north side of the end row, and the plants by the side of the trench are, with the aid of a fork, pushed over so that they are leaning towards the north. Soil from the second trench is placed over the stems. Some experts cover the whole of the stems, leaving only the heads exposed, while others cover only the roots and a slight portion of the stems.

It may be necessary to well water the roots after this operation; but as the work is done during November, it is not generally necessary to do this.

Frames are also at times used as a protection. They are placed over the plants as they stand. Some growers make their plantations so that the frames will fit without leaving any plants exposed. Plants may also be lifted when a sharp spell

of weather is likely to take place, and replanted close together in a pit if this is available, or in a cold greenhouse. This work needs doing very carefully, or the plants will suffer.

§ EARLY BROCCOLI

Sowings may be made in frames during February or March, and the young plants planted out in the open as soon as they are of sufficient size. Such plants will be ready for use in the autumn, when broccoli are usually scarce and in very good demand.

HARVESTING

The best time to cut this vegetable is as little time as possible before it is required for use. The heads should be between 3 and 6 or 7 inches in diameter before being cut. Like cauliflowers, they should be cut before they have lost their compact appearance, for with the loss of this there is also a decided loss of quality.

If the heads are not needed for a time, there is a method of keeping them for some time in good condition. The plants which it is necessary to keep are carefully lifted as for transplanting, and are hung roots uppermost in the dark, in a cool place. Cold water is sprinkled on them every day, and they will not deteriorate for some time.

EXHIBITION

Broccoli are sometimes needed for exhibition, in which case heads which are evenly shaped and of good colour should be chosen some time before they are wanted. Leaves should be taken from plants which are not wanted and laid over them to keep out both light and cold. The plants should be frequently examined to see that no troublesome insect or pest has found its way beneath the leaves and is doing damage. If the heads mature too quickly, they may be kept in good condition for the show in the manner described under harvesting.

Plants selected should either be well mulched about a month before they are needed, or they should be given a weekly application of liquid manure. Either treatment will improve the heads very considerably.

During very sharp weather other protection may be necessary

in addition to the covering of leaves. It is usual to show six heads in a collection of vegetables.

MANURES

As stated earlier, it is on poor and medium soils that a heavy dressing of manure is of the greatest advantage when making preparation for this crop. On poor soils such a dressing is very important if the crop is to mature to perfection.

Both superphosphate and lime are very useful if applied to the soil before planting. About 3 cwt. of superphosphate per acre will be sufficient. This will often serve the purpose of the grower better if at the same time 1 cwt. of sulphate of potash is also applied.

Even more beneficial than this to many soils is an application of fresh lime before planting. This serves the purpose of preventing attack by club-root, which is one of the most serious troubles with which the grower of this crop has to contend.

In cases where the soil has been thoroughly dealt with from a manurial point of view for a previous crop, it will not be necessary to treat it for broccoli.

The one great drawback to over-manuring is that the plants become tender, and are not able to withstand severe weather.

VARIETIES

There is such a host of varieties from which to choose that even the expert is puzzled as to which to select, and those who are inexperienced find it almost impossible to know which kinds are best suited to their needs.

It is not advisable to grow too great a number of varieties ; so long as a succession of good quality heads can be insured, the object of the grower should be obtained.

Michaelmas White and Self-protecting are good varieties to grow for use up to December. Early Market, Snow's Winter White, and Winter Mammoth are useful for the early months of the year, while from April onwards Satisfaction and Late Queen are good varieties to grow.

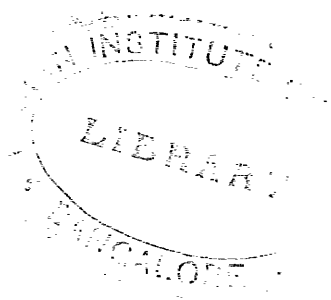
PESTS AND DISEASES

The many pests and diseases to which broccoli is subject are common also to the cabbage, and they are dealt with under this vegetable.

§ SPROUTING BROCCOLI

These are a profitable vegetable to grow. They are very hardy, needing no protection during the severest weather; apart from this, they should be treated in the same way as broccoli.

Seeds should be sown in April, and the plants should be generously treated. Both white and purple varieties are available, but the purple are to be preferred for all ordinary purposes.



CHAPTER VI. BRUSSELS SPROUTS

§ BRUSSELS SPROUTS

GENERAL CULTIVATION

THERE are few vegetables which, if properly grown, answer better than do Brussels sprouts. They are a very popular dish, and when in season they are always in demand.

As with many other vegetables, there are one or two definite points in the cultivation of these which will make the difference between success and failure in the production of sprouts of good quality.

Two of the points of most importance are that the soil should be thoroughly worked and that growth should not be hurried. Slow growth with this crop will usually ensure good results.

Sowings of seed may be made in the open during the second or third week in March. A bed for this purpose should be prepared in as sheltered a position as possible. For a successful crop, the strongest of the seedlings should first be transplanted to another prepared bed, the plants being placed 3 inches apart.

A few days later a second batch may be moved from the seed bed in the same way. This may be repeated two or three times until the whole of the seedlings have been placed in the nursery bed. By this means, from the same bed, plants may be obtained which will not all mature at once, but which will be ready for market over a period of several weeks.

From the nursery bed the young plants should be transplanted to their permanent quarters when about 6 or 7 inches high. They should be ready for moving to their final position during May.

The most suitable soil for the permanent bed is a good loam rather on the heavy side. This should be deeply dug, and if a quantity of farmyard or stable manure is available, this should be worked in. This should, if possible, be done in the autumn, and the plot should be worked down just before it is wanted for planting. It is essential that the soil should be firm.

The smaller kinds may be planted 2 feet 6 inches apart each

way, while the more vigorous kinds may be 2 feet 6 inches in the rows, but the rows should be 3 feet apart. It does not pay to crowd this crop, neither does it pay to plant them between potatoes, as is often done. There are other members of the Brassica family which do better when planted in this way.

When moving the plants to their permanent positions, dull, showery weather should, if possible, be chosen. If the weather is fine and dry, with no prospect of a break, they should be "puddled" in.

The remainder of the work consists in hoeing regularly and in removing all dead leaves.

EARLY CROPS

Earlier crops may be obtained by sowing seeds during the last fortnight in February in a frame. The plants will need moving from this frame to the nursery bed in the ordinary way.

Drills should be drawn out when sowing the seed, to a depth of about 1 inch, and the drills should be about 1 foot apart. This applies to seed sown in the open as well as to that sown in frames.

Plants from seed sown in this way will be ready for market before the earliest of those sown in the open; but in every case growth should not be forced, but spread over as long a period as possible.

HARVESTING

The sprouts should be cut off as they are ready for use. It is bad practice to break them off. Usually those at the bottom of the stem will be ready first. It is unwise to take too many sprouts from each stem at the first gathering. Another mistake too often made is to cut off the heads of the plants too early. Some growers do this under the impression that the sprouts benefit; actually, the opposite is the case.

Plants may be lifted and planted in a north border if late crops are wanted. November is the most suitable month for this. Usually the first sprouts will be ready during October, and they will continue to come in steadily from this time onwards.

EXHIBITION

Brussels sprouts are exhibited in two ways. Whole plants are shown, or a dish of sprouts may be asked for. In any case,

the method of cultivation is the same as that previously advised. The best plants should be selected in the early autumn and given occasional dressings of some suitable fertiliser. Care should be exercised when choosing sprouts not to allow size to weigh too heavily. Good firm sprouts of even size and shape will obtain a greater number of points.

MANURES

In addition to the farmyard or stable manure which the grower has already been advised to work into the soil when making preparation for this crop in the autumn, there are other fertilisers which may with advantage be employed with this crop. It must not be forgotten that there is no crop which pays better for generous treatment than does the Brussels sprout, and there is no crop which will so easily fail to produce profit if the essential points in the cultivation of this crop are neglected.

Superphosphate is a useful fertiliser, applied just before planting at the rate of from $1\frac{1}{2}$ to 3 cwt. per acre. Sulphate of potash may also be used at the rate of from $\frac{1}{2}$ to 1 cwt. per acre. Other suitable fertilisers are kainit for sandy soils, and for use when the plants are growing, a light dressing of nitrate of soda ; soot is also useful.

VARIETIES

Choice of suitable varieties is important with this vegetable, as there are a number of kinds which produce a big percentage of worthless stems, and take away very quickly from the profits of the crop.

Among the most reliable may be mentioned Perfection, Dalkeith, Wroxton, Pride of the Market, and Matchless.

There are other good kinds, but the greatest care should be exercised when making a selection, and the inexperienced would be well advised to grow only those kinds which are known to do well in the district.

PESTS AND DISEASES

The same pests which attack the Brussels sprouts attack the cabbage also, and they are dealt with under this head.

CHAPTER VII. CABBAGE

§ THE CABBAGE

GENERAL CULTIVATION

Few vegetables are more widely grown than the cabbage, and, like the Brussels sprout and the broccoli, few vegetables answer better on the market garden.

The cabbage possesses the advantage of being very easily grown, but it pays well for careful cultivation and attention. One particular advantage of this vegetable is that it is obtainable at almost all seasons.

Soil should be deeply dug and well manured, and while this vegetable will grow on almost any kind of soil, it does best on a good loam, which should not be too light.

July and August are the most important months for sowing this crop in the open. The seed bed should be well prepared, and the soil should not be too heavy. Drills should be drawn out, which should not be too deep, and the rows should be about 9 inches or 1 foot apart.

Young plants will do best if planted on to a nursery bed as soon as they are large enough to be moved. Some growers prefer to sow the seed thinly broadcast. In any case, too early sowing is not advisable, or a proportion of the plants may run to seed.

Planting out into the permanent positions should take place during September. In planting out a great deal depends upon the size of the variety grown and the method of growing practised. If alternate plants are to be taken out early, they may be placed much closer together in the row than if all the plants are wanted for market at the same time. The distance varies between 1 and 2 feet in the row, and the distance of the rows apart from 18 inches to 2 feet.

The plants will do best if planted out during dull, showery weather; and while it may not be advisable to wait any length of time, it is mostly an advantage to delay for a week or ten days, as, like most other vegetables, if the plants are put in the

ground when weather conditions are exactly favourable, they will very quickly make headway, while if growth is checked at the start through unsuitable weather conditions, the plants never really seem to make up for this lost time.

It will, however, during certain seasons undoubtedly be necessary to move the plants when both weather and soil are dry. When these conditions prevail, the plants may be puddled in. Planting with a dibber is not as satisfactory as is planting with a trowel.



Different types of
Dibbers.

Shallow trenches may also be drawn out and well watered, and the plants planted in these. Sometimes a thin mulch of manure is placed in the trenches before planting is done.

Whichever method is practised, it may be necessary to continue the watering at regular intervals, should the weather keep dry, until the plants have become well established.

A reserve bed of young plants should be kept so that any plants which do not look like doing well, and any which fail to grow, may be replaced.

The remainder of the work consists in keeping the land as clean as possible by means of hoeing at regular intervals.

§ SUMMER AND AUTUMN CABBAGES

Sowings should also be made at intervals from March onwards. The vegetables from these sowings will be ready for summer and autumn use. Early kinds may also be sown in boxes during February. They will need the protection of a frame. As soon as the young plants are big enough, they should be pricked out on to a prepared bed in a frame. They should not, however, be kept without air. This should be given as freely as possible. Later they must be carefully hardened off and transplanted on to an open bed. The success or otherwise of this crop will largely depend upon the care with which this final transplanting is carried out.

HARVESTING

With the cabbage this is a simple operation, but not always is it given even the small amount of attention it requires. It

should be cut when in the best possible condition, but the market gardener has to contend at times with adverse markets.

By leaving a few of the lower leaves when cutting, instead of taking the head off right close to the ground, a further supply of tender young heads may be obtained. The heads will be small, but they form an excellent dish, and in some towns they are in demand. A still further supply may be obtained after the first batch of small heads are removed if the land is available to allow the cabbages to remain until these mature.

EXHIBITION

Large heads are not the best for exhibition purposes. Those chosen should be of medium size, as much alike as possible, and quite free from damage by insect pests.

It is advisable to select cabbages for this purpose some time before they are wanted. They should be mulched, especially during dry weather, and they may need watering from time to time.

During very hot, dry weather the selected plants will need shading.

MANURING

To grow cabbages well they should be generously treated. When preparing the soil, an ample supply of farmyard manure should be worked in. If possible, horse manure should be used on heavy soils, while light soils should be treated with pig or cow manure, or both.

Another necessity for the cabbage is lime. This may be applied separately, or as part of a fertiliser. It is very essential that it should be given unless it is already plentiful in the soil.

Superphosphate and kainit applied at planting time may take the place of lime if the latter is not available. Superphosphate may be applied at the rate of 5 or 6 cwt. per acre, and kainit at the rate of 4 cwt. per acre. Two applications of nitrate of soda may also be applied; about $\frac{1}{2}$ cwt. per acre should be given when growth commences, and a further $\frac{1}{2}$ cwt. about a month later than this. On heavy soils, sulphate of ammonia may take the place of nitrate of soda.

VARIETIES

Probably few growers of any experience do not give Ellam's Early a place in the garden. It is a first-class general purpose

vegetable, and both with market and private growers is very popular. Early Etampes, Glory, Early Offenham, and Flower of Spring are other good varieties. This list does not by any means cover the reliable kinds. To do so would serve no useful purpose, but probably make the work of selection for the inexperienced grower at all events more difficult.

§ PICKLING OR RED CABBAGE

Although methods of cultivation for this cabbage are similar to those already described, there are one or two marked points of difference.

Seed should be sown about the middle of August, and the young plants planted out in a sheltered position in September, at a distance of about 6 inches apart. In the spring they should be finally planted at a distance of from $2\frac{1}{2}$ to 3 feet apart. They need a greater amount of space than does the green cabbage. It does not do well except in good, well-worked ground which has received an abundance of manure.

Sowings may also be made in March or April. These will produce somewhat smaller heads than those made in August, which will be useful for either pickling or for ordinary purposes.

Blood Red is a good pickler, as is also Red Dutch.

§ COLEWORTS OR COLLARDS

A variety of cabbage which is hardy, quickly matured, and comparatively small are the coleworts. The treatment and soil conditions suitable for these are exactly the same as for the cabbage, except that they need a smaller amount of space in which to develop, from 12 to 14 inches being ample.

Seed may be sown during any of the summer months, from March to August, but main crops are usually sown in July.

The colewort is an excellent catch crop.

§ SAVOY CABBAGE

Although the savoy is at its best on a good, heavy soil, it is a profitable crop to grow almost anywhere, as it will stand very severe weather, and is improved to some extent by frost.

Sowings are usually made in the spring, during February.

March, or April. The first sowings are made in a frame ; but for all practical purposes, sowings in the open in March or April are sufficient.

Seed may be sown in drills, or broadcast, many growers preferring the latter method. If sown in drills, these should be about 9 inches apart, and the seed should, in either case, be thinly sown, and the young plants carefully thinned.

For market purposes the larger kinds are the most popular, though some of the smaller sorts are of superior quality. The market grower must, however, cater for the public taste, and should select those kinds which produce good, large heads.

The final planting out will usually take place towards the end of June or during July, when the plants should be set about 18 or 24 inches apart, according to the kind which is grown.

The savoy does well after early peas or broad beans.

The same manures are suitable as for the ordinary cabbage, but the quantity of farmyard manure should, if possible, be increased.

Drumhead and Ormskirk are two good kinds for market growing, as is also Best-of-All.

PESTS AND DISEASES

Finger and toe or club-root is a disease which is very troublesome at times in the cabbage patch. It also attacks turnips and wallflowers at times, as well as other allied plants.

Roots of young plants attacked by this disease are swollen and knotted, and the plants attacked do not make headway when planted out. The leaves turn an unhealthy colour, and little or no growth results.

Plants affected by this disease should be taken up and burned. It should be remembered that this disease is often spread by means of manure, so that to give affected plants to animals is to run the risk of spreading the disease.

Lime is a preventive. The disease is never found on chalky soils or on soils which contain a good deal of lime. Sour and particularly acid soils favour the disease. Certain fertilisers use up the lime in the soil and tend to encourage the disease. Such fertilisers should be avoided for crops subject to attack. Sulphate of ammonia and superphosphate are two such fertilisers.

A good dressing of lime on soil on which plants are subject to attack will prove beneficial. Care should also be taken not to

plant for some time crops liable to attack on soils which have carried an affected crop.

The gall weevil is another serious trouble to which members of the cabbage family are subject. The weevil itself is about $\frac{1}{8}$ inch long, and is striped, being dark coloured. Eggs are laid on the stems of cabbages, and these hatch later into white larvæ, which continue to feed upon the plants for between three and four months, causing the galls to form, from which this pest gets its name.

Attacked cabbages should be taken up and burned. A good soil fumigant should be worked in when the land is dug in the autumn.

There are two cabbage white butterflies, both of which are very well known. They are responsible for a great deal of injury in the cabbage patch, and a good deal of loss to the grower.

The large white butterfly lays clusters of eggs on the undersides of the cabbage leaves, while the small white butterfly lays its eggs singly in similar positions. It is in the caterpillar stage that damage is done to the plants.

A good watering, if the water is applied with sufficient force, will do a good deal towards ridding a plantation of these pests. They often almost entirely disappear after a heavy storm. As a rule the market grower cannot handpick the whole of his plants; but where this is possible, as for the private grower, it is an effective means of getting rid of the pest.

The cabbage moth is often responsible for a great deal of loss to the market grower. The eggs of this moth are laid in groups on the leaves. The caterpillars which hatch from these eggs are greenish in colour, and they damage the plants by eating their way to the hearts of those attacked.

Poultry are fond of the pupæ of this moth, and, given the opportunity, will eagerly devour them.

Cabbage aphid is, like its numerous relatives, of the green fly family, too well known to need description. It does at times a good deal of injury to cabbages as well as to other vegetables connected with these.

There is no real remedy. Spraying with soft soap and quassia will do a good deal towards clearing the plantation, and badly damaged leaves may be picked off and destroyed.

Other troubles to which members of the cabbage family are subject are black rot, cabbage powdered wing fly, cabbage root fly, cockchafer beetle, and cabbage white rust.

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Thinning out Carrots. The final thinnings are carried out after those that are to be taken out are large enough to be of use.

CHAPTER VIII. CARROT

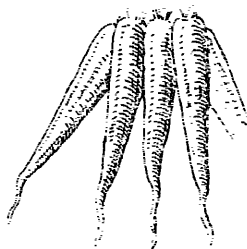
§ THE CARROT

GENERAL CULTIVATION

ALTHOUGH carrots may be successfully grown upon almost any soil, they have a very marked preference for a warm, sandy loam of good depth, and it is upon such soils that roots of quality are most easily obtained.

It is not possible to produce the long varieties on shallow, heavy soils, and on these the stump-rooted kinds only should be grown.

On a large scale, carrots are not always a profitable crop. Sometimes big profits are made; at other times they scarcely pay for growing. They are, however, a crop which the average market gardener cannot do without, and in very many cases he has regular customers where he can dispose of a proportion of his crop at a fairly steady price.



Long rooted Varieties of Carrots.

It is very important that the soil is deeply and thoroughly cultivated. Perhaps with no other crop does success depend so much upon this. If manure is applied at all at the time of planting, it must not be applied to the surface soil; but rotten manure may be worked in at least two spits deep, although this is only advisable under exceptional circumstances, such as when the soil is in very poor condition.

The ground should be roughly but deeply dug over during the autumn or winter, and left in that condition until the spring. Lime or soot, or both, may with advantage be applied to the soil.

MAIN CROP

Just before sowing, the soil should be forked over and worked until it is a fine tilth. This should be done during the early part of March; about the middle of this month the first sowing

may be made on a suitable warm, light soil, but on colder soils a later date should be chosen.

Draw out drills 9 or 10 inches apart and about $\frac{1}{2}$ inch deep. Choose a fine day when the land is fairly dry for the work. The seed may be mixed with earth for sowing, and the back of a rake may with advantage be used to cover the seed with fine soil when sown. If desired, the seed may be sown in clumps of four or five at intervals of 3 inches. A mistake often made is to sow the seed far too thickly. Thin sowing in the drills is advisable.

As the carrots grow they should be thinned; but it is not advisable to thin out drastically at first, as some of the young roots may be found useful.

The first thinning should be to about 2 inches apart, and this should take place as early as possible. The plants taken out at this thinning are of no further use.

As soon as they are large enough to be of use for cooking, they should again be thinned to about 6 or 8 inches apart. The young carrots which are taken out on this occasion may be bunched for market.

The greatest care should be taken, when thinning for the last time, not to leave two or three in a clump. This is often done if the thinning is carelessly carried out. It is best to do the work after a shower of rain, when the young roots will pull out of the ground easily; otherwise on some soils some of the tops will break off, leaving the roots in the ground.

On certain soils it is advisable to leave the carrots rather more closely together after the final thinning, as if this is not done they will grow coarse and large, and many of them will split and be rendered useless for market.

The main work after this is to keep the weeds in check. This is best done by constant hoeing. The Dutch hoe is very useful if the ground is gone over regularly while the weeds are still small. The spaces between the plants in the rows should also be kept clear of weeds.

Dressings of soot from time to time will, during the growing period, also prove very useful and beneficial.

HARVESTING

Fine weather should be chosen for harvesting carrots. This is best done during the early autumn, in October or early

November. A fork will be needed for the work on heavy or medium soils, but there are a few light soils on which these roots may be pulled out by hand.

The tops should be cut off close to the crown, and the roots stored until they are needed.

The usual method of storing where any large quantities are grown is in a clamp, in the same way that potatoes are stored. Carrots should not be stored on damp earth. If the quantity is not very large, a circular clamp may be made; but for large quantities a long clamp about 4 feet wide by 3 feet high is preferable.

Four or 5 inches of straw is then placed over the roots, roughly "yelmed," or pulled out straight, as for thatching. Earth is then taken from a trench dug round the clamp and placed over the straw to a depth of 4 or 5 inches. The digging of the trench not only provides earth with which to cover the carrots, but ensures that they be kept dry, as it acts as a drain during any excessive downfall.

Should the weather at any time prove very severe, it may be advisable to add a little more earth to ensure the safety of the roots.

If the quantity of carrots grown is not large, they may be stored in sand or dry earth in a shed, which must, however, be dry. Few cellars are dry enough for this purpose, although a dry cellar makes a suitable storage place for this crop.

No attempt should be made to clean roots which are to be stored, but the thickest of the earth should be rubbed off.

LATE CROPS

Early varieties are the most useful for late sowings. These should be made during July or the early part of August. These may be sown in drills 8 or 9 inches apart, though some experienced growers prefer to broadcast seed thinly during this month, as the carrots from seed sown in this way protect one another from the weather.

Thinning out of late crops need not be so severe as for the main crop, but as soon as they are large enough they should be thinned to 4 inches apart.

A quantity of litter should be available near to a bed of late sown carrots, so that if there is any danger of frost, the bed may be protected by covering to a sufficient depth with this material.

Later than this, further sowings may be made in sheltered positions, where they can, if necessary, be covered with a frame, or the sowings may be made in frames. There is no need to use the glass until necessary; but when there is danger of very keen frosts, mats may be used as an additional measure of safety. In very warm, sheltered situations a sowing may be made during August or September; the bed covered with a good thickness of dry litter, and the roots left in the ground during the whole of the winter. There are, however, very few spots in this country where it is advisable to practise this method. Carrots grown in this manner should be ready for use during March and April.

FORCING

Although carrots may be forced with success, they will never succeed if growth is hurried to any extent. Carrots for forcing are grown in frames on a mild hot bed.

Heat should not be greater than from 60 to 70 degrees in the day-time, or from 50 to 60 degrees at night.

Farmyard or stable manure and leaves mixed some time before they are needed, form the most useful material from which to make the hot bed. Manure from stables where horses have been littered with straw and fed with corn is better than anything. In order that the hot bed may last, it is advisable to mix equal parts of new manure with old manure. The bed should be about 3 feet 6 inches in depth, and should extend about 2 feet beyond the frame. After the frame is placed in position, cover with from 8 to 12 inches of fine soil. A useful compost may sometimes be obtained from old hot beds, but the greatest care should be taken to get it into a sufficiently fine condition.

After sowing the seed, which should be done broadcast, just cover with a fine layer of soil.

It may, and probably will, be necessary to water once or twice, but if it is possible to grow the crop to maturity without the aid of the watering can or the hose, better shaped roots will be obtained.

It is a profitable practice to sow radishes with this crop, as these will be ready for use before they interfere with the carrots.

As soon as the roots are big enough, thin them out to about 3 inches apart.

Frames should be kept closed after the seed is sown, until

growth begins, after which it is advisable to give air whenever the weather is suitable.

In addition to the glass, extra protection will be needed in very severe weather. When the weather is warm enough, the lights may be taken off all day, and as the nights get warmer the frames may be used for other purposes.

They may also be forced in brick pits, but not every grower is the fortunate possessor of one of these. Carrots may be forced in this way from November onwards. It is usual to make successional sowings through the winter. There is usually a keen demand for these out-of-season vegetables. From February onwards they may be grown in a cold frame until the time for sowing out of doors arrives.

EXHIBITION

On very suitable soils it may not be necessary to give carrots for exhibition purposes any very special preparation, excepting extra care to the cultivation of the soil and special attention to everything connected with the growth of the crop. Fine, straight roots of suitable size and colour may then be drawn out, and the very best chosen for the show. It is advisable to cover the shoulders and tops of the carrots with a little fine soil to prevent them turning green.



Stump rooted
variety of Carrots.

There are, however, not many soils suitable for the cultivation of show carrots without special preparation; but although special preparation is more necessary on some soils than on others, exhibition carrots may be successfully cultivated on the most unsuitable soils.

The soil should be thoroughly and deeply dug in the autumn or winter, and in the spring it should be broken up to as fine a tilth as possible. Holes should then be made in the soil about 1 foot apart in the rows, the rows being about 1 foot to 18 inches apart, according to the variety it is intended to grow for exhibition purposes. A crowbar is a suitable implement for boring these holes, which should be from 15 inches to 2 feet 6 inches deep. The shallower holes are for the shorter varieties, while the deeper holes are for the long kinds.

These holes should be about 5 inches wide at the top, tapering to almost a point at the bottom. They should be

filled with a good, light loam. There is nothing better than old potting compost for this purpose, but this is not always available. The soil should be pressed firmly, but not too firmly, into the holes.

Four or five seeds, which should be obtained from a reliable firm to ensure their being of good quality, should be sown in each hole. After the seedlings are up, all except the strongest should be removed.

The hoe should be kept busy, and a good fertiliser may be used with advantage. A dressing of soot from time to time will also prove beneficial.

Should the weather come dry, give a good watering occasionally.

If necessary, store the roots in clean sand in a vertical position.

MANURES

Although carrots are best grown on soil which has been free from stable or farmyard manure for at least a year, it is an advantage if the soil has been well and thoroughly manured for a recent crop.

A good fertiliser applied at the time that the soil is being prepared for the crop will usually be found to result in much heavier crops of better quality. Both soot and wood ashes are useful for this purpose; but, better than either of these, a mixture, for light soils, of superphosphate and kainit in equal parts; about 7 lbs. to the square rod.

For stiff, heavy soils 3 lbs. of basic slag should be used with 2 lbs. of kainit on the same area of land.

Either sulphate of ammonia or nitrate of soda may be used when the carrots are growing nicely. Both of these are best applied in showery weather, as they are quick acting. From 1 to 2 lbs. per square rod may be used with advantage.

VARIETIES

For the main crop there are few varieties more suitable than Veitch's Matchless, Long Red Surrey, Early Market, Sutton's Favourite, and St Valery. For forcing as well as for late sowings, French Horn, Early Nantes, Inimitable, and Scarlet Champion Horn are all useful.

There are, however, many other useful varieties for all purposes which may be obtained from seedsmen of repute.

PESTS AND DISEASES

Although not one of the vegetables most subject to disease or to attack by insect pests, there are one or two troubles which sometimes cause very serious loss to the carrot grower.

Perhaps the most troublesome pest is the carrot fly. This pest is troublesome during dry weather, and it is the maggot of this insect which is the cause of the mischief.

The carrot fly is a little less than $\frac{1}{4}$ inch in length. It is greenish-black in colour, and lays its eggs on the roots of carrots during the latter part of spring and summer. The presence of this pest may be known by the unhealthy appearance of the leaves of the plants before it shows itself in any other way.

In order to prevent the fly from gaining access to the roots, and so prevent the eggs being laid, it is a good plan to draw earth up as close round the carrots as possible and to keep them tightly earthed up.

The maggots are shiny, whitish in colour, and without legs. They are about $\frac{1}{4}$ inch in length. During an attack, if a few roots are lifted, maggots may be seen partly in and partly out of holes in the roots.

Paraffin and soft soap is the most useful spray for this pest. The soil is watered with the mixture, 1 pint of paraffin oil being used to about 4 gallons of water.

Carrots which are seen to be attacked by the foliage may be easily known; they should be pulled up and burned at the earliest opportunity.

Carrots also suffer from carrot disease. This shows itself in the form of brownish coloured spots on the roots and a kind of mould on the stems. There is no remedy, but roots known to be affected should be pulled up and burned.

Wireworms and the leather jacket grub are two other troubles which are likely to lessen the weight of marketable carrots from the land devoted to this crop.

CHAPTER IX. CAULIFLOWER

§ CAULIFLOWER

GENERAL CULTIVATION

THE cauliflower is numbered among the most important vegetables in the garden. It is not difficult to grow with reasonable care and attention, and possesses the advantage that it may be grown with success on most soils. In addition, it is a popular vegetable for the table.

The most suitable soil for this crop is a good loam ; in fact, whatever kind of soil is available, moisture is essential if success with this crop is desired.

The ground to be occupied with cauliflowers should be well manured. Like the rest of the cabbage tribe, they are heavy feeders. It should also be deeply dug.

On dry soils it will be necessary to resort to watering, which should be given freely. In dry weather the plants, in almost any position, will benefit if water is freely given.

Sowings are made during the autumn or the spring, the former being for use during the following spring and early autumn ; the latter will be ready for use in the late summer and autumn. It is in this way possible to have a continuous supply from spring until almost the end of the year.

The time for the autumn sowings will vary with the situation. In the north it will be necessary to make the first of these early. The end of August or the first week in September will be a suitable time. In the south the first sowing may be delayed until the end of September or the first week in October.

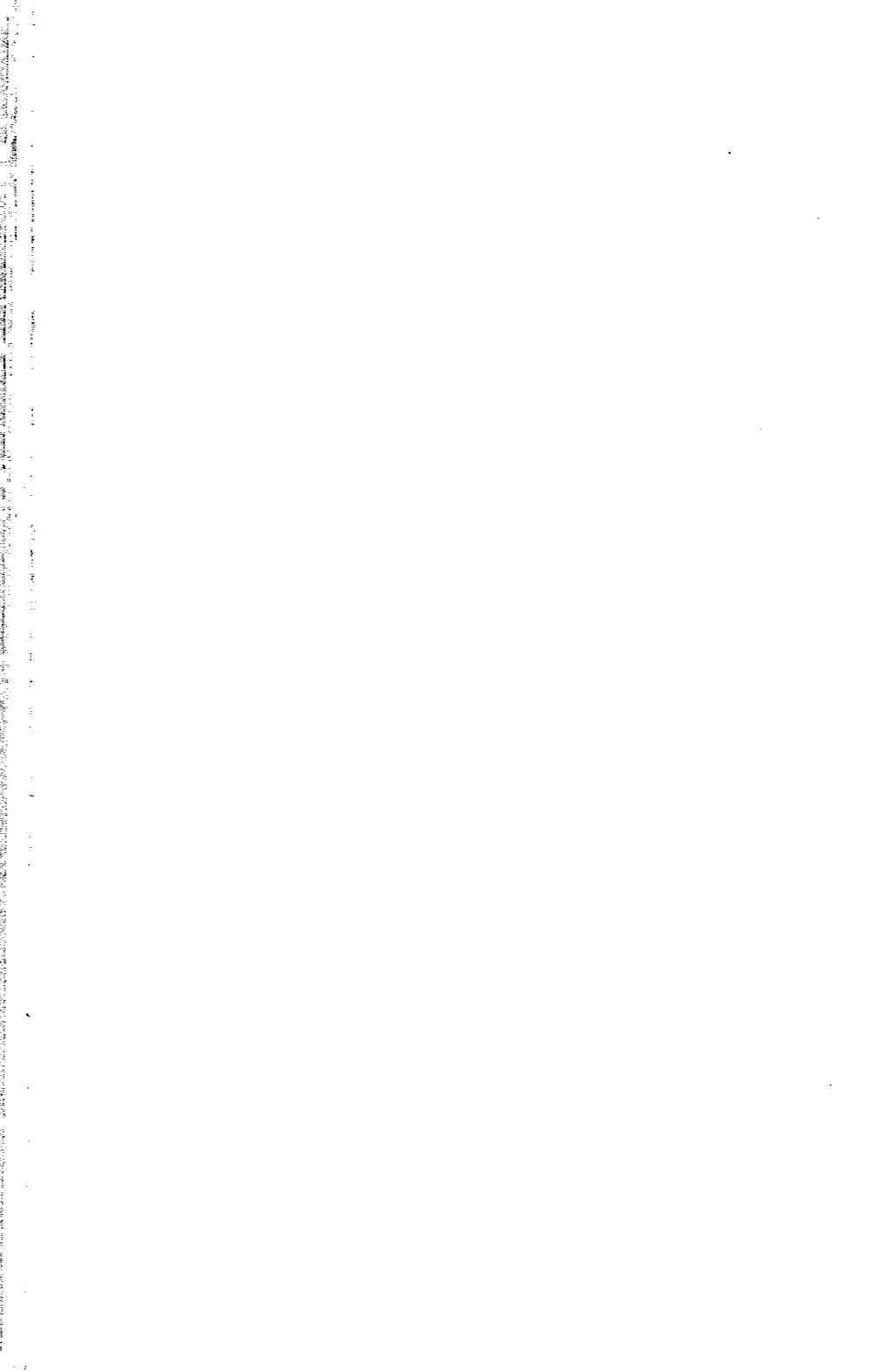
The soil for the first sowing should not be too rich. The seed should be sown thinly broadcast. As soon as they are big enough to handle, the seedlings should be pricked out to a cold frame. The soil should be still on the poor side ; but apart from this and the shelter of the frame, no other special preparation is necessary. The plants should stand 3 or 4 inches apart in the frame or frames.

Watering should be done with care. On some soils very little



Taking out useless Cauliflower Plants and replacing them by healthy Plants.

To face p. 66.



watering will be required, while on others it will be necessary to water from time to time.

Except in very severe weather the frames should be well ventilated, so that the plants receive a plentiful supply of air. During severe weather, however, the lights should be kept down, and it may be necessary to give further protection by means of mats.

March will usually be early enough for setting out the plants, and it may be advisable to wait until April. Should weather and soil conditions prove favourable early in the year, however, the plants may be set out in February. It may be necessary to give protection for a short time.

They should, at this final planting out, be given as good a piece of land as can be found for them, and this should have been well prepared. The plants should be planted from 18 inches to 2 feet apart.

A further sowing should be made about a month later and treated in the same manner.

Plants may also be sown in April or May. The seed bed for these may be in the open, and should be well prepared. When the young plants are large enough to move, they should be planted about 3 or 4 inches apart on to a prepared bed. They should be moved to their final quarters before they have attained any size.

These plants will probably reach a larger size than will those from seed sown in the autumn, and they should therefore be given more room in which to grow at the final planting. Usually from 2 to 3 feet will be found sufficient, according to the variety chosen.

In addition to these two periods, a sowing may, if desired, be made in February if the seed is sown on a mild hot bed. The young plants, after planting out, should be treated in the same way as the plants from seed sown later. For market purposes they are often planted among cos lettuce or among radishes, so that the best possible use is made of the space available.

Water should be freely given to cauliflowers, if necessary. This vegetable cannot thrive in a dry season unless it is given plenty of water. When crops are grown on a large scale this is not always possible. For this reason the surface soil should be kept in such condition that it retains as much moisture as possible.

HARVESTING

Cauliflowers need careful attention as soon as the heads begin to form. For market purposes, colour and compactness are both important. A leaf broken over the head will help to form a protection to keep it a good colour.

Cutting at the proper time will ensure a compact head. If the plants are left too long uncut, the heads will open out and they will be spoilt for market. Even should there be more than it is possible to market profitably at once, the plant should be taken up with the roots and packed closely together in a cool, dark shed, or they may hang roots uppermost in a dark, cool place. In either case the leaves and roots should be regularly moistened. Plants treated in this way will keep for a considerable time, but after a week or ten days they will begin to deteriorate.

EXHIBITION

For exhibition purposes the methods of culture already mentioned and advised are suitable. It may be necessary to make small sowings at intervals, and suitable plants may be drawn and hung stalk upwards in a cool, dark place about a week before they are wanted. The roots and leaves should be sprinkled with water every day.

MANURING

Cauliflowers, like other members of the cabbage family, well repay generous feeding. Farmyard or stable manure, which should be well rotted, should be worked in the soil in abundance when this is being prepared. Twenty loads per acre is a suitable quantity to use. It should be remembered that there is a difference in the nature of horse manure and that of cow and of pig manure. The first of these is suitable for heavy soils, as it helps to keep the land open. The other two are more suitable for light soils.

The addition of lime will be found to benefit most soils on which it is required to grow good quality cauliflowers.

Superphosphate and sulphate of potash are also useful fertilisers, applied at the rate of about a quarter of a ton to the acre, using $3\frac{3}{4}$ cwt. of superphosphates to $1\frac{1}{4}$ cwt. of sulphate of potash. This is best applied just before planting.

VARIETIES

Snow Queen, Autumn Giant, and Magnum Bonum are three first-class varieties which should always be grown. Walcheren, Monarch, and Eclipse are excellent, among others, for use in late summer and the autumn. Mont Blanc and Early Dwarf Erfurt are suitable for early summer supplies. It would, however, be useless to attempt to give all the good varieties which it is possible to grow, but those given will do well under a wide range of differing conditions, in which they possess an advantage over certain other kinds.

PESTS AND DISEASES

Most of these are dealt with under cabbage. The earwig is an additional pest which at times is the cause of serious loss to the vegetable grower. The usual and most effective way of dealing with this pest is by means of traps. Small flower-pots are filled with grass and placed upside down on canes near the plants. The earwigs crawl into these, and if they are emptied each morning and the catch destroyed, a good deal will be done towards lessening the trouble.

CHAPTER X. CELERY

§ CELERY

GENERAL CULTIVATION

THIS popular vegetable is not one of the easiest to grow to perfection. The weather plays a very important part in the success of this crop on a large scale, but good cultivation is even more important. Celery properly grown is a useful crop from the point of view of cleaning and improving the soil.

Although it may be grown on almost any kind of soil if it is properly prepared, it does not like a heavy clay, and should only be grown on soil of this description when no other is available.

A really good rich loam, not too heavy, is the best, and as soils which suit a crop need less labour to grow it successfully, it is advisable to give any crop the most suitable soil available.

For nearly all vegetables good drainage is a necessity, and celery is no exception. The deeper the soil is dug, the better; and it should also receive a good dressing of farmyard manure, which should be well worked in at the time of digging.

Celery may be sown at various times, the most usual being March, the middle or end of the month, and during the first fortnight in April. It is probable that for all general purposes the second sowing will prove the most useful. For this sowing, shallow boxes should be filled with good loam, or, better still, with potting compost. Seed should be sown thinly on the soil, lightly covered with earth, and the boxes placed in a cold frame, on a mild hot bed or in a greenhouse. As the young plants grow they will need regular watering, and then should be gradually hardened off by taking off the lights of the cold frame, or by similar means.

A bed should be prepared on good soil in a sheltered position, and to this the young plants should be transferred as soon as large enough. It is, however, a mistake to plant in the open too soon. A method which answers very well and which makes it



Keeping the Celery row clean.

To face p. 70.

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possible to have celery fit for use over a long period, is to take the largest of the young plants from the boxes for a first planting out, allowing the smaller plants extra time in which to grow before transferring these to the prepared bed.

Celery may be planted out at the final planting in trenches or on flat beds. The most usual way is to plant in trenches in single rows; but double rows may, if desired, be used. A wider trench will, of course, be needed should it be decided to plant double rows. Where possible, single row planting in trenches is recommended, but excellent results will follow any of these methods.

When plants are transferred to the position they are finally to occupy, the larger leaves should be taken off before moving them, as this prevents anything in the nature of a serious check taking place. Care should be taken to move the plants without disturbing the roots any more than necessary, and to do this, unless the soil is already wet, it is a good plan to give the bed a thorough soaking with water about forty-eight hours before any of the plants are to be taken up. This will help forward the work very markedly.

TRENCHES

If possible, it is better if the soil to be occupied by celery trenches can be well dug and left rough in the autumn. It can then be levelled and the trenches prepared in the spring. The trenches should be dug out 1 foot deep. If good soil finishes at this depth, a few inches of soil should be taken from the bottom of the trenches and the soil below this dug over, having a layer of manure worked in with it. Above this then place 4 or 5 inches of well-rotted manure and cover with several inches of good soil. This should bring the bottom of the trench to within 2 or 3 inches of ground level.

PLANTING IN TRENCHES

When the celery is to be planted in the trenches, care should be exercised to choose a suitable day for the purpose. Hot, sunny days should be avoided, but during showery weather, when there is little or no sun, conditions will be favourable for the work. The time of planting will vary between the second week in May and the second week in July.

Varieties differ in vigour, and this will make a difference to

the distance apart the plants should be. Usually from 7 inches to 1 foot is a suitable distance, the smaller growing kinds being the smaller distance, while the more vigorous kinds are given the larger distance.

If it is decided to plant two rows in one wide trench, a method only recommended when the most has to be made of the space at the disposal of the grower, the distance between the rows in the trenches should be about 1 foot, while the distance between the plants in each row should be from 6 to 10 inches, planting so that each plant in one row stands midway between two plants in the other row.

When lifting the plants for transferring them to the trenches, care should be taken that as much earth as possible adheres to the roots of the plants. If the weather is dry, it is as well to give the plants a thorough watering about twenty-four hours before they are to be taken up. After planting in the trenches they should again receive a really good watering.

Additional waterings will be needed from time to time should the weather prove dry.

It is often the practice to purchase plants of a suitable size for planting out; these should have been packed in damp moss or some similar material to prevent the roots getting dry, and on receiving them they should be planted in the trenches at the earliest possible moment. If left out of the ground for any length of time, not only will a proportion fail to grow, but those that do will receive a set-back from which they will never fully recover.

Should the weather continue hot and dry after planting, it is advisable, if at all possible, to give the plants a certain amount of shade for a time. This is not possible where big areas of land are given over to the cultivation of this crop.

EARTHING UP

This should be commenced when the plants are from 12 to 14 inches high, which is usually some time in August. All small leaves at the sides of the plants should first be removed. It is not advisable at this time to place the earth closely round the plants; this may be done at the second stage of the operation. A hoe or a fork may be used for the first earthing up; a spade is the most suitable for the second.

Great care is necessary during the whole operation that soil

does not get to the heart of the plants between the growing stalks. In order to ensure this the tops must be held together in some way. This may be done by tying the heads just below the leaves, or it may be done by one person holding the heads together while others press the soil round the plant. The soil should first of all be cleaned of all weeds and then well broken up.

If the heads are tied before earthing up, the ties should be removed after the operation to allow the plants to continue growing.

During the following month further earthing up will be necessary. Up to this point soil taken out of the trenches has been used for the purpose, but as soon as this has been used up it will be necessary to dig into the surface soil below the trenches. It is not advisable to dig too closely to the celery rows; sufficient space should be allowed on either side to form a foundation for earthing-up operations.

Still another earthing up will be needed, and this will probably take place some time during October. A little lime mixed with the soil on this occasion will prove beneficial in keeping off slugs and other harmful pests. If there is likely to be any serious trouble from pests of this kind, it would be advisable for both the first and second earthing up to mix lime with the soil in a similar manner.

The soil is broken up, as before, and placed round the plants, the heads of which are tied or held together while this is being done to prevent soil getting in between the stalks. On this occasion the soil should be pressed firmly round the plants. Care should be taken that no hollow is left just round the stems after the final earthing up, as if such hollows are allowed to remain, it is probable that too much moisture may find its way to the plants and cause them to rot. Frost also may cause injury if the earth is only loosely placed round the plants.

PLANTING ON THE FLAT

Although planting in trenches is by far the most usual method of planting in this country, planting on the flat is favoured in some districts, and is largely practised in France. It possesses one big advantage over the trench system, in that a great deal of labour is saved; but while celery of good quality may be obtained by both methods, the trench system will, if carefully

carried out, produce a crop superior to that which can be obtained from beds.

The usual width of beds to be used for celery is about $4\frac{1}{2}$ feet. The soil is dug out of the beds to a depth of about 1 foot, and thrown out on either side. If this is levelled it may be used for quick-growing crops.

The bottom of the bed receives a thick dressing of manure, which is dug in. The plants are planted in rows about 1 foot apart, the plants being from 6 to 9 inches apart in the rows.

When first planted the plants should be well watered, and, if necessary, at intervals afterwards. It will be necessary also to stir the surface soil by means of the hoe from time to time until the plants become too big for this to be carried out with safety.

BLANCHING

Several methods of blanching for celery may be suitably employed for that grown on the bed system. Stiff brown paper collars may be used for the purpose. These should be tied round the plants. Mats placed over the tops of the plants will also answer.

Another method is to place two boards on edge between two rows, and fill the space with soil taken from the alleys; when the boards are removed, the soil is placed round the plants.

This method deprives the celery to some extent of the shelter from frost which it receives when no earth is taken from the alleys. On the other hand, the beds are sure of being thoroughly drained, as by taking earth from the alleys for earthing up, any excessive moisture will drain into these instead of remaining in the beds.

HARVESTING

Celery is not usually dug until it is wanted for market. After digging it is washed, all rough and side leaves are removed, and the roots are trimmed, after which the celery is tied in bundles for marketing. Usually a bundle contains a dozen heads, though in some cases it consists of eight heads only.

Celery grown in this country is not usually stored, but in other countries it is the practice at times to store it for a time, or rather to lengthen the period of blanching so that it is ready at

a later date. It is doubtful, however, if the quality of celery which has been treated in this manner is equal to that which has been marketed as soon as lifted.

EXHIBITION

In order to be successful on the exhibition platform, a good deal of care will need to be exercised in the selection of a suitable variety. The ground will need to be thoroughly manured, and, in addition, frequent applications of liquid manure will do a great deal towards improving the quality of the plants.

Especial care should be exercised in earthing up celery intended for exhibition, and it is advisable to blanch by means of brown paper collars.

These bands need only be a few inches in width at first ; as growth develops, further widths should be added until the plant is covered for the correct height, care being taken not to tie the paper too tightly round the plant. It is advisable to place a little soil round the base of each brown paper collar so that watering and feeding may continue.

Celery to be exhibited should be lifted about twenty-four hours before it is wanted for showing. It is treated in a similar manner to celery intended for market, only the work is carried out very much more carefully.

MANURES

Celery, to do well, needs an ample food supply. In some countries it is the practice to grow this crop almost entirely in manure. It is difficult to dress too heavily with manure soil on which it is to be grown. If, in addition, liquid manure is available, this may with advantage be applied at intervals.

Apart from this, except in exceptional cases, no further feeding should be necessary.

VARIETIES

The selection of varieties is particularly important, and the market grower would be wise to give these every consideration. Sandringham White is an excellent early variety, as is also Extra Early Market White and Paris Golden. For late crops Giant White is recommended, together with Standard Beaver and Major Clarke's Red.

PESTS AND DISEASES

The celery grower is subject to a large number of troubles in the way of pests and diseases which attack this crop. Sometimes they do very serious damage, and at times even ruin the whole of the crop.

Among the worst of the troubles to which this crop is subject is the celery fly, which lays eggs singly on the surface of the leaves. The larvæ which hatches from these has no legs and is green in colour. It does an enormous amount of damage when present in large numbers, and very quickly destroys the foliage of plants attacked.

The best means of keeping at bay this pest is to give the leaves at regular intervals a dusting of fine soot. In order to be effective, soot must be sprinkled on the plants two or three times a week; particularly should this be done during the month of June.

Celery leaf blight is another trouble which damages the foliage, and is usually most common during a wet season. Leaves affected first become spotted with pale spots, and finally rot and wither.

There is no remedy; but diseased plants, as soon as they are noticed, should be pulled up and burnt. When the disease has attacked a crop, no further celery should be grown on that particular piece of land for three or four years.

Celery rust is occasionally the source of serious trouble to the celery grower. As its name implies, it causes rusty brown spots to develop on the leaves, usually during the autumn. Sometimes the whole of the crop is attacked and the leaves destroyed.

Spraying with liver of sulphur—or, to give it its correct name, sulphide of potassium—and water will do good: 3 ounces of liver of sulphur, together with 4 ounces of soft soap, is used with 10 gallons of water.

The soft soap and the liver of sulphur are dissolved separately, additional water being added afterwards to make 10 gallons, and the whole is thoroughly mixed. The wash should be used while still fresh; if allowed to stand for any length of time it will deteriorate.

The celery stem fly is about the size of the celery fly. The maggot, which is almost cream in colour, finds its way into the root of the plant and gradually works its way into the leaf

stalks. Patches of a brownish colour appear on the leaves of attacked plants.

All attacked plants should be taken up and burnt as soon as noticed, and a good soil fumigant should be used on the land. It is also inadvisable to plant celery on the same or on adjoining land for a year or two.

CHAPTER XI. HERBS

ALTHOUGH herbs are not the most important of the market grower's produce, most growers find it necessary to devote some space to the cultivation of these. This is especially the case where a local trade is done. It is true that certain herbs are less popular than others; but the amount of space occupied by these is small, and it is always advisable to have as complete a stock as possible.

§ ANGELICA

This serves a double purpose. Not only are the leaves and stalks eaten in the same way as celery after blanching, but parts of it are candied and used for flavouring cakes, as well as for other similar purposes.

Seed should be kept in moist sand some time before sowing, and flower spikes should be removed as soon as they appear. Drills for the seed should be 1 foot apart when they are sown in April. The young plants should be thinned 1 foot apart as soon as they are large enough.

§ BALM

Sow these seeds in April or May in drills about 1 foot apart, or it may be propagated by means of cuttings, which should be taken either during the spring or the autumn. It may also be propagated by root division, but this method is not recommended.

§ BASIL (Bush and Sweet)

Of these the sweet variety is the most useful, but both are propagated in a similar manner, and are used for the same purpose. Seeds may be sown out of doors in April or May, and as soon as they are big enough to handle, the plants should be set out from 8 to 10 inches apart, in rows about 1 foot apart. Slugs often damage these plants, and as a preventive fine cinder ashes should be placed round each plant. The flower

stems should be cut to within a few inches of the ground as soon as they reach the blooming stage. They are then tied into small bundles and dried for winter use.

The plants may be lifted and potted during September when, if placed in a greenhouse, new growth will be made, the leaves of which will be valued late in the season.

§ BORAGE

This plant will thrive almost anywhere, but does best on poor land. Once established, no difficulty should be experienced in keeping a regular supply, as self-sown seeds will continue to spring up. These will need thinning from time to time.

§ CHERVIL

The seed of both the parsley-leaved chervil and the fern-leaved chervil should be sown in small quantities at intervals from the spring to the autumn. Drills should be about 1 foot apart, and the young plants should be thinned to stand 6 or 7 inches apart in the rows. Should dry weather prevail, it may be necessary to water freely from time to time. If there is sufficient demand, it may be advisable to make further sowings in boxes, in heat.

§ CHIVES

Bulbs of this herb should be planted out in the spring. It will grow on almost any kind of soil, and is propagated by division. Rows should be from 10 inches to 1 foot apart, and the plants should be 6 or 7 inches apart in the rows. Every four years the plants should be lifted, divided, and replanted on new soil.

§ FENNEL

Seeds of this should be sown in April, and the young plants thinned out to about 14 inches apart. The plant will stand for several years, but it is advisable to renew it by fresh sowings every few years.

§ MARJORAM (Pot)

Seed should be sown in the open during April, and the plants be thinned to about 1 foot apart each way, or roots may be

purchased and planted out this distance apart. Sowings may also be made in heat during February and March. Plants should be cut off close to the ground as soon as growth is finished, and tied in bunches to dry in a cool place.

§ MARJORAM (Sweet or Knotted)

Sow these seeds in the open in the spring, and allow the plants at thinning time at least 1 foot each way. Early sowings may be made in slight heat.

§ MINT

This herb is usually propagated by division of the roots during the spring or autumn. Other names by which this plant are known are spearmint, green mint, pea mint, and lamb mint. It is both popular and profitable, if well grown, and it also pays for forcing in the winter.

It likes a good soil, which should not be too dry, as the plant does best in a rather damp situation. In addition to propagation by division, cuttings may be taken during the summer. These consist of the tops of young shoots, and they should be planted in a moist situation.

Plants obtained by division should be planted in rows about 1 foot apart, and the holes for the young plants should be about 3 or 4 inches deep. Drills may be drawn to this depth if desired.

Beds of mint may be kept down for several years but it is advisable to lay down fresh plantations every year, or at intervals of not more than two years, or the quality of the herb will deteriorate.

By placing shallow frames over beds of mint during the last week in February or the first week in March, and covering these with mats for a time, the mats being removed from the frames during the daytime as soon as the plants have begun to grow, the mint may be forwarded to some extent.

By packing roots of mint in boxes and placing them in a greenhouse or some other position where a temperature of 60 degrees can be maintained, it is possible to force mint during the winter. Another method of forcing which is largely

practised is to make up a hot bed about $1\frac{1}{2}$ feet thick and cover with soil to a depth of from 6 to 8 inches, and cover with a frame. When the temperature is about 60 degrees or a little more, the roots should be packed closely together in this and covered with soil. Air should be admitted under the lights, and the roots should be well watered. Mats should be applied at night.

In selecting mint for cultivation, care should be taken, as while many varieties are equally good, certain other varieties are unpleasant to the taste and are not worth growing. Narrow-leaved mint is the most useful kind.

§ PARSLEY

Like mint, if properly grown, parsley is a profitable crop. It is not advisable to grow this herb in a big way unless one has a definite outlet, as returns when it has to be marketed in the ordinary way are sometimes unsatisfactory for big quantities. There is always an outlet for small quantities, however, especially if the plant has been well grown.

Parsley is an attraction for rabbits and hares which at times will do a great deal of damage to a bed. In districts where these animals are plentiful, some means of protection should be taken.

The fact that certain crops are easy to cultivate is often the cause of inferior crops being raised. Like most plants which can be easily grown, parsley pays for being well cultivated, as the price realised is considerably greater for good quality parsley than for that which has been neglected. The latter does not pay for growing.

Parsley will grow in many different kinds of soil, but to get good results it must be moist, and should be well worked. It should also receive a liberal application, when being prepared, of well-decayed manure. Light soils are the least suitable for this herb.

Three or four sowings should be made every alternate month, the first in February or March, the second in April or May, the third in June, and the fourth in August.

If the first sowing is made in February it should be made in shallow boxes, in heat, the plants being pricked out into other

boxes and hardened off. They may be planted in their final quarters in April.

Sowings made out of doors should be made in drills about 1 foot apart. It is advisable not to sow too thickly. As soon as the plants are large enough they will need thinning out to a distance of 5 or 6 inches apart.

When the leaves become coarse, as they will after a time, they should be removed so that fresh growth of tender young foliage may be made. There are several good varieties available, among the best being Giant Curled and Exhibition Curled.

§ SAGE

Sage for commercial purposes must be propagated by means of cuttings from reliable stock. If desired, seed may be sown during April or May, but the plants which result from such sowings are not always satisfactory.

Cuttings should be taken during early summer, and planted about 3 or 4 inches apart on light soil. It is a plant which likes a warm, dry soil, and as soon as the cuttings are rooted they may be planted out on such a bed, a distance of about 1 foot or 14 inches apart. If desired, old plants may be taken up, divided, and replanted during the autumn.

If it is wished to grow this herb from seed, sowings may be made in spring in the open, or in February if given the protection of glass. The seedlings should be pricked out as soon as they are big enough, and later transplanted to their final quarters at a distance of about 15 inches apart.

§ SAVORY (Summer and Winter)

Summer savory is an annual, while winter savory is an evergreen. Both of these plants need, however, similar treatment, and they are therefore dealt with together.

Seed should be sown in April, in drills from 10 inches to about 1 foot apart, and the young seedlings should be thinned to about 6 or 8 inches apart. During dry weather water should be given freely. When in flower the plants should be cut down and bunched for use in the winter.

§ SORREL

Sorrel seed of the large-leaved kind is sown in the spring in drills about 6 inches apart, the young plants being thinned to about 4 or 5 inches apart. During September the bed will need a further thinning so that the plants are about $1\frac{1}{2}$ feet apart. If desired, the plants which are taken out at this thinning may be replanted in a separate bed a similar distance apart.

§ TARRAGON

This herb, which is used for flavouring vinegar as well as for several other purposes, is best propagated by division of the roots, or by cuttings. Roots of the old plants should be divided in the early spring, and the divided plants carefully planted 15 inches apart each way. If cuttings are taken at the same time, these will need to be inserted in slight heat to give them a start. For winter use, roots of this herb may be lifted and placed in a box of light, moist soil, in heat. Such roots will furnish a supply of fresh green leaves at a time when they would otherwise be unavailable.

§ THYME (Common)

There are two methods by which this plant may be raised with comparative ease. Roots may be divided in the spring, or seed may be sown in April; cuttings may also be taken during the summer. If the plant is propagated by division, the divided plants should be planted a distance of about 14 inches apart each way. If cuttings are taken, these will need to be kept moist until they are rooted. Seedlings should be pricked out to a distance of 4 inches apart as soon as they are large enough to handle, and should be transplanted to their final positions during the autumn.

§ THYME (Lemon)

This plant is propagated by division of the roots in the early spring. It cannot be grown from seed, but, apart from this, its cultivation is similar to that of the common thyme.

CHAPTER XII. KALE, OR BORECOLE

§ KALE, OR BORECOLE

GENERAL CULTIVATION

As a winter vegetable, kales are of the greatest importance. Especially during a severe winter are they in demand, as they will pass unharmed through frost which will destroy other vegetables.

Like other members of the cabbage family, they do best on a strong loam, which should be well worked ; but they will, if reasonably well looked after, do well on almost any kind of soil.

Seed may be sown any time during the month of March. Some growers prefer to wait until the end of the month. A further sowing may be made in April. The seed should be thinly sown and the young seedlings thinned out as soon as possible. The kales will grow into better plants if they are pricked out on to a nursery bed before being planted in their final quarters. If this method is adopted, the plants should be planted 6 inches apart each way.

On the other hand, successful results may be obtained by planting direct from the seed bed to their final quarters. Dull, showery weather is the most suitable for planting out this vegetable. It is often grown between such crops as early potatoes.

MANURING

Kales should not be over-abundantly manured. If the soil is in a reasonable condition, neither farmyard nor stable manure should be necessary. A dressing of superphosphate may be an advantage, and on many soils plants will be considerably benefited by an application of this fertiliser at the rate of about a quarter of a ton per acre. In addition, 1 cwt. of sulphate of potash per acre will also prove useful.

VARIETIES

Among the many varieties of kale which are worth growing, Cottager's Kale is one of the most useful. There are some

kales which are both useful and ornamental, and these include the Variegated Kale. Curled Scotch is another excellent variety for the market grower, while Labrador is a good dwarf variety to grow.

CHAPTER XIII. LEEK

§ LEEK

GENERAL CULTIVATION

IN very many districts the leek is an important vegetable. In other parts it is not so widely appreciated, but while the demand varies to some extent, it is always present in a greater or lesser degree.

The leek is not difficult to grow. The soil should be deeply cultivated and heavily manured if good results are expected. The kind of soil is not important, as most reasonably good soils are suitable. It is particularly valuable on account of its hardiness. It will stand through the most severe weather without damage.

Although earlier sowings may be made, March is the month which is most suitable in which to sow the seed. Drills for this purpose should be drawn about $1\frac{1}{2}$ feet apart.

Thinning out should not be done all at once, but the strongest plants should be first taken out of the seedling bed and transplanted. A little later a further thinning should be made, the plants removed at this thinning being transplanted in the same way. If the plants in the bed after this thinning stand 7 or 8 inches apart, no further plants should be removed, those in the bed being left to mature as a still later crop. If the plants are still too close together, a further thinning should be made in the same way.

One important point is that of thorough drainage. Leeks cannot be grown successfully on badly drained soils; but on good, well-drained soils, or on rather dry soils, excellent results may be obtained.

There are several successful methods of planting the young seedlings when they are big enough to be moved from the seed bed. They may be planted in drills; they may be planted on the flat, or they may be planted in trenches. The last method is most suitable for planting on to light soils.

For the first method, drills should be drawn from 1 foot to

18 inches apart, and from 3 to 6 inches deep. With the aid of a blunt dibber, make fairly deep holes about 8 or 9 inches apart. Care should be taken not to double the roots too badly when planting. The holes should not be filled right up, but a little loose earth placed in each sufficient to cover the roots. Ordinary work with the hoe will gradually fill up the holes sufficiently.

It is the practice of some growers to shorten the leaves slightly when transplanting. It is a matter of opinion whether or not any improvement results from this operation. Other growers shorten the roots to some extent; but this has nothing to recommend it, as it can only result in hindering the growth of the plants.

It may be necessary to water from time to time. Should this be the case, water should be generously applied.

If the leeks are planted on the flat, the method of cultivation is similar, only the holes made with the dibber should be somewhat deeper.

Should it be decided to plant in trenches, which is the most suitable method on very dry soils, the trenches should be made in the same way as celery trenches. Trenches formed for leeks should be about 1 foot wide, and there should be about 1 foot space from the inside edges of two of the trenches, so that the rows of plants will be about 2 feet apart.

Several inches of manure are placed in the bottoms of the trenches, which will bring the bottom of the trench to a level of 6 or 7 inches below the ground. By this method the plants should be set a little farther apart in the row, as finer plants are likely to be obtained.

Transplanting should take place in dull, showery weather, but not when the soil is sodden with moisture after heavy rains.

EARLIER SOWINGS

Seed may be sown in boxes during January, the boxes being placed in a temperature of from 55 to 60 degrees. The young plants grown in this way should be transplanted 3 or 4 inches apart each way into other boxes, where they should remain until March, when they should be hardened off and planted in the open in the same manner as previously advised.

BLANCHING

This is not a difficult matter. The simplest method is to draw up the earth to the stems. It is not advisable to complete this work in one operation, but to draw up a small quantity of earth at first. This may be done two or three weeks after planting out, and to repeat this several times until the amount of stem it is desired to blanch is covered. Soil used for this purpose should not be lumpy, but should be broken up finely.

Brown paper bound not too tightly round the stems is another method, and cardboard tubes may be used for the same purpose, if available, as may also drain pipes 2 or 3 inches in diameter.

EXHIBITION

Leeks from seed sown late is useless for exhibition purposes. January or early in February is the proper season for sowing, and the seed and young plants should be dealt with in the same manner as described for earlier sown seeds.

It is advisable that leeks intended for exhibition should, after hardening off, be planted in trenches, and these trenches should be somewhat deeper than those advised for general cultivation. Apart from this, the after-treatment is similar; but the greatest care should be exercised in carrying out each of the different operations, and particularly in blanching.

MANURES

In addition to a thorough dressing of farmyard or stable manure when preparing land for this crop, benefit will be received from a little bone meal applied at planting time. Superphosphate is also a useful manure to use. If bone manure is not used, a bone superphosphate will be found especially suitable. A method of applying artificial fertilisers which has given excellent results, is to apply these mixed with water. Among the fertilisers which may be used in this way are kainit, nitrate of soda, and superphosphate. Half a pound each of superphosphate and kainit may be mixed with 8 gallons of water. If nitrate of soda is used with this mixture, a slightly smaller quantity of this should be used.

VARIETIES

Among the many varieties which may be planted with the assurance of satisfactory results may be mentioned The Lyon, London Flag, International, and Renton's Monarch.

PESTS AND DISEASES

Properly grown, this crop should not suffer greatly from either pests or diseases. Those that are likely to be at all troublesome are also more destructive to onions, which *see*.

CHAPTER XIV. LESSER GROWN VEGETABLES

§ THE CARDOON

GENERAL CULTIVATION

IN addition to those vegetables which are grown everywhere and which occupy the greater part of the land in both market and private gardens, there are a number which are of considerably less importance, but which will be grown in greater or smaller quantity, according to the demand in that particular district or the inclination of the grower.

The cardoon is one such vegetable. It is a close relative of the globe artichoke, and is sown on the flat or in trenches, according to the nature of the soil. On very dry soils the trench method of cultivation is a necessity. Where this is the case, trenches are made about 4 feet apart in a similar manner to those in which celery is to be planted. If sown on the flat, drills are marked out 3 or 4 feet apart.

In either case three or four seeds are sown in patches about $1\frac{1}{2}$ feet apart. This should be done during the third or fourth week in April. It is a good plan to cover the patches with flower pots until growth begins. In cold districts the seed is started under glass, and planted out as soon as the seedlings are big enough, which will be some time in May.

Whenever the weather is dry it will be necessary to supply water freely, and it is a good plan to give an application of liquid manure from time to time.

The seedlings should be thinned when large enough, leaving only the strongest in each position; later, it is usual to secure them to stakes.

By September the plants should be ready for blanching, and there are several methods of carrying out this operation. The simplest method is to tie each head firmly round with raffia or bands of hay, choosing a fine dry day for the work; then earth up, or, better still, cover each plant from bottom to top with straw before earthing up. Still another method is to tie brown paper round the plants before earthing up. It will take about a month for blanching to be completed.

§ CHICORY

GENERAL CULTIVATION

Chicory properly treated forms an excellent salad, but up to the present it is not very largely grown, although there are signs that it is increasing somewhat in favour.

Great care should be taken to obtain seed from a reliable source only, as much of the seed of this plant is not very satisfactory, plants obtained from it showing a tendency to revert to the wild state.

Soil on which this crop is grown should be of good quality, but manure, if used, should have been applied for a previous crop.

Drills should be drawn out about 1 foot apart, in which the seed should be sown, and the young plants should be thinned to 9 inches apart in the row.

The roots should be carefully lifted in November, the tops cut off, and the plants packed closely together in deep boxes. Light soil should then be filled in between the plants until the crowns are reached.

It is then necessary to store in a perfectly dark shed or cellar which is sufficiently protected to be free from damage by frost. Watering will be necessary when the plants show signs of drooping.

About three weeks or a month after storing, gathering may be begun. For this purpose the leaves should be broken rather than cut off.

It is not advisable to lift all roots at once for packing into boxes, but a few at a time, as needed. If all the roots are lifted at once, those not likely to be wanted for some time should be heeled in on the north side of a wall.

§ CRESS

Cress is so usually grown that to give information as to its culture seems almost unnecessary. There are, however, one or two points in the cultivation of this salad which will make a great deal of difference to the quality of the crop.

It is advisable to sow cress in small quantities. Soil on which

it is to⁵be sown should be reduced to as fine a tilth as possible. Thick sowing is not advisable, but at the same time sowings which are too thin should also be avoided.

During the winter, cress may easily be grown in shallow boxes under glass. If not cut soon enough it is of little value.

Where mustard and cress are grown together it is advisable to sow the cress about three days before the mustard, as the latter is the quicker growing of the two.

§ ENDIVE

Endive is increasing rapidly in public favour, but it is scarcely yet generally grown on a very large scale.

Endive likes a good, rich loam, but it may be grown on almost any soil if sufficient care is exercised in the preparation for this crop.

Soils of a heavy nature are the least suitable for this crop, but with the aid of cinders, old rubble, and similar materials, these may be brought into a suitable condition to grow the crop successfully.

Drills should be drawn out about $1\frac{1}{2}$ feet apart if it is desired to sow where the plants are to remain. For some reasons this method is to be preferred. If checked at all, as is the case when the plants have to be transplanted, this vegetable shows a strong tendency to bolt. When the seed is sown on the permanent bed and thinned to the correct distance, this tendency is avoided to a considerable extent.

The plants should be thinned to about 1 foot or 15 inches apart in the rows.

Where endive is sown on a seed bed and transplanted, the seed is sown in drills about 6 inches apart, and when the plants are big enough to handle, transplant to a bed of light, rich soil, and do not leave them in the nursery bed for too great a length of time.

Early in the year seed may be sown under glass, if very early crops are desired.

There are several ways of blanching endive. The simplest, though not always the most satisfactory, is to tie up the leaves. This method is not of much use in a wet season.

When the weather is wet, a flower pot may be turned upside

down over the plant, but the hole must be stopped up to exclude light. During winter, plants may be lifted as they are wanted, with a ball of earth attached to the roots, and placed in a dark place such as a cellar.

It takes considerably longer to blanch endive in the winter than it does in the summer. During the latter period it should not take longer than ten days, but it may take three weeks or a month in winter.

There are two kinds of endive, the curled and the broad leaved. The former kinds are particularly suited for salads, while the latter are more useful for stews.

§ HORSE RADISH

For the owner of a private garden or a grower doing a retail trade, this is a subject which cannot be ignored. For the market growers whose business is run on wholesale lines, the cultivation of horse radish has little to recommend it. There is little, if any, demand for English horse radish in the shops.

Horse radish will grow almost anywhere and anyhow, and this has led a great many gardeners to neglect its proper cultivation, with the result that a product of very inferior quality is produced.

To obtain horse radish of good quality, the soil should be deeply dug and given a good dressing of manure. Planting should take place in spring. Single crowns should be planted, having roots between 7 to 12 inches in length. Plant about 1 foot apart each way. When these are required for use, the roots should be from $1\frac{1}{2}$ to 2 inches in diameter and about 1 foot long.

Roots may be kept in good condition for some time in sand.

§ MUSTARD

Mustard and cress are largely used for salading. Cress has already been dealt with. The two are often grown together, but this method is not recommended.

White mustard, brown mustard, or rape are all largely used, especially the last, where market gardening is concerned. It

certainly serves the purpose, but white mustard stands far ahead of it for quality, and is to be preferred from every point of view except that of cheapness.

There is no difficulty in the cultivation of this crop, which is cut in the seed leaf stage; but when it is to be used with cress it should be sown three or four days later, as it grows so much more quickly.

During the winter, seed may be sown in shallow boxes and placed in heat.

§ SALSIFY

Salsify is not very well known in this country, and has therefore been grown only on a small scale where at all. The demand is not such as to warrant a grower devoting any big amount of land to this crop, although it is very highly valued where it is known.

An additional reason why salsify has been almost ignored in the past is the fact that it requires rather careful cultivation if a successful crop is to be raised.

Salsify may be raised in either light or heavy soils, but preferably the former. If seed is sown on heavy soil the land should be deeply dug and thoroughly worked before sowing.

Two sowings are usually made in April, the first during the first week of this month, and the second during the third or fourth week.

Drills should be drawn out about 1 inch in depth and about 15 inches apart, and when the plants are up they should be thinned. At first the weakest only should be taken out; but after a week or so, thinning should take place again, and the strongest plants left at intervals of 9 inches or 1 foot.

Towards the end of October or the early part of November the plants will be ready for use. The usual practice then is to lift a part of the crop and leave the remainder in the ground. Salsify may be stored in loose sand in a cool shed, or it may be stored in clamps.

If chards are required, a part of the crop may be left in the soil throughout the whole winter. Chards are the young flower stems which shoot up in the spring, and which should be cut while young and tender, and treated in almost exactly the same way as asparagus.

§ SCORZONERA

This is very little grown at present, but on account of the benefit to health which may be derived from it, it deserves to be more popular.

Cultural details are exactly the same as for salsify. Carelessness in any direction will result in crops of poor quality.

A good variety is that known as Giant Russian.

CHAPTER XV. LETTUCES

§ LETTUCES

GENERAL CULTIVATION

To succeed with lettuces they must be obtained at the right time. Especially must the market grower be particular upon this point, for there are certain seasons when this vegetable is so plentiful that it is worth very little, and certainly cannot show a profit to the grower.

On the other hand, lettuces placed on the market at the right time will meet with a ready demand at a good price.

Spring and early summer lettuces are the most profitable, and it is the grower who is able to market his crop during this period who obtains the best results, although in many cases it will be desirable to devote some space to later crops of this vegetable.

The two classes into which lettuces are placed are the cabbage and the cos. Both classes may be grown on most kinds of soil if care is taken in the preparation of this; but the cos lettuce is the most particular, and where this does not succeed the cabbage lettuce may be successfully cultivated.

A good, light loam of a rather sandy nature suits this vegetable better than any other soil. Lettuces are often grown as catch crops, and where this is the case the soil receives the treatment necessary for the main crop. Preparations for the lettuce consist of deep digging and thorough manuring. It is also important that the land on which this crop is to be grown is well drained.

The main crop of lettuces should be sown in the open during March, and further sowings may be made during April, May, and June. Drills should be shallow, and should be from 6 inches to 1 foot apart. Thinning should take place as soon as the young plants are big enough to handle, leaving those that remain standing about 1 inch apart in the row. Further thinning should take place later if the plants are to remain where the seed is sown, the thinnings being transplanted

as a catch crop if suitable ground is available for the purpose.

Cos lettuce should be grown during this period in preference to the cabbage variety, as the demand for the latter will have fallen off by this time.

EARLY CROPS

For earlier crops than this, seed should be sown under glass during the first three months of the year. Seed sown in this way, given plenty of air (unless the weather is altogether unsuitable) and slight heat, will be very little trouble. The young plants should be transplanted to frames when they are about a month old, at a distance of 3 or 4 inches apart. The plants will need hardening off slowly, after which they should be planted 1 foot apart each way in a sheltered part of the garden. If planted in an exposed position, a good deal of loss is likely, should there come a spell of severe weather.



Simple method of marking out single drills.

So that supplies may be continued until sowings out of doors are possible, further sowings should be made at intervals of about a fortnight. Both the cos and the cabbage varieties may be successfully grown in this way, and both should prove profitable.

AUTUMN SOWINGS

Lettuces may be had almost throughout the whole of the winter by making sowings under glass during September or October, and, if necessary, also by making further sowings on hot beds during the winter.

Autumn sowings are best made in cold frames. The seed bed should consist of a good rich loam of a light nature. Thinning will be necessary, and the plants which are removed may, if space is available, be transferred to other beds in frames or in greenhouses, or under cloches.

Autumn-sown lettuces may be planted on hot beds during the winter months, if desired. The work should be carefully carried out, and the temperature should be kept between 60 and 70 degrees at night.

Sowings may also be made during July and August, and such

sowings will provide autumn as well as early winter crops if the weather proves suitable.

Many of the better varieties do not need tying, but the loose-growing kinds should be tied about ten days before the plants are wanted.

EXHIBITION

Lettuces intended for exhibition should be given ample space in which to grow. They should also receive generous treatment, being fed from time to time with liquid manure. They should be tied about ten or twelve days before they are wanted.

The cos lettuce may be grown more successfully if trenches are prepared in the same way as for celery. These trenches need not be a great distance apart, and the ridges between the trenches may be used for other purposes.

Several small sowings should be made so that a supply is available when needed.

Lettuces for exhibition should be carefully lifted as late as possible, and the roots should be washed clean.

MANURES

In addition to farmyard or stable manure, which should be freely supplied when the ground is being prepared, the plants will also benefit if liquid manure can be applied from time to time. Guano is a useful manure to give either just before the seed is sown, or after sowing, or both. Kainit and basic slag are excellent for use on poor ground. The former should be used at the rate of from a quarter to half a ton an acre. A good deal will depend on the soil; but should this be of good quality there should be little, if any, need of assistance in addition to the manure applied when the soil is being prepared for the crop.

VARIETIES

Among the best of the many good varieties of cabbage lettuce available may be mentioned All-the-Year-Round, Hardy Cabbage, Perfect Gem, Marvel, and Passion. For forcing, Market Forcing and Earliest-of-All are useful kinds.

Among the most useful of the cos varieties are White Cos, Paris White, Superb White, and Balloon; while for forcing, the Gray Paris is suitable.

PESTS AND DISEASES

The lettuce does not escape rather more than its fair share of pests and diseases. These are more in the nature of ground pests than of other insects, though the larvæ of one or two moths are at times the cause of loss.

Among the worst of the ground pests are leather jacket grubs. These are a source of trouble not only to the vegetable grower, but to the grower of fruit and other plants, when this pest exists in any quantity. Leather jacket grubs are difficult to deal with, but on land on which they are known to live, one of the reliable soil fumigants should be worked in. Especially is this necessary where grass land is being dug up, and it is the only practical way of dealing with the pests when they exist in large numbers.

Constant hoeing will do a great deal of good, and they have many natural enemies, among which are numbered wasps. These carry large numbers of the adult flies to their nests and devour them. Enemies of the grubs are moles, pheasants, gulls, rooks, starlings, thrushes, and blackbirds.

The leather jacket is the grub or larva of the daddy long legs, or crane fly. It varies from 1 to 2 inches in length, and is rather a dirty colour. It has no legs, but powerful jaws, with which the damage is done to the crops.

A further source of trouble to the lettuce grower are snails and slugs. These pests, which are too well known to need describing, may be dealt with by means of soot or of lime, the latter being most effective. To be effective the lime should be finely powdered, and, above all, it should be fresh. Three or four applications should be made early in the morning at intervals of about twenty minutes, when a big proportion of the snails will be destroyed.

Soot should be applied in a similar way, and although not quite as good as lime for the purpose, it is, nevertheless, very effective.

Fumigants may be worked into the soil in the autumn with excellent results. These have the advantage of destroying other pests as well as those now being dealt with.

Both snails and slugs have many natural enemies among birds, and the toad will also destroy large numbers of their young.

Lettuce downy mildew is a disease which attacks the plant. It covers the undersides of the leaves with a white mould, and later kills the affected leaves. Plants attacked should be pulled up and burnt.

The larvæ of the tiger moth are very partial to lettuce. The caterpillars may be easily known, as they are covered with long hairs. The bodies are dark coloured and the hairs at the side are rusty brown. Where they are seen to be attacking the crop, hand picking should be resorted to.

The caterpillar of the great yellow underwing moth also attacks the lettuce, among other plants. It is to be found during the latter part of June and July. It is about $1\frac{1}{2}$ inches long, and is greenish or brownish in colour. It rolls itself up when disturbed.

For this pest also the best remedy is to hand pick as soon as it is seen to be present, and to keep a lookout for its further appearance.

Lettuce root aphid is one of the aphides which attacks the roots of lettuces. Plants attacked will droop, and are rendered worthless for use or for market. Plants which are attacked may be known by their drooping appearance; they should be taken up, dipped in soapy water, and destroyed by burning.

CHAPTER XVI. MUSHROOM

§ MUSHROOM

GENERAL CULTIVATION

MUSHROOMS are not difficult to grow ; they are, nevertheless, a rather tricky crop with which to succeed for those who are not prepared to exercise care in preparation for this crop. From the point of view of the market grower, mushrooms possess the very big advantage that the demand is always greater than the supply. The grower has always at command a market which will return him a profitable price for his crop. This is an advantage possessed by very few vegetables.

They may be grown at almost any season. It is best to make a beginning when a steady temperature is most easily obtained.

An important point in the production of this crop is the quality of the spawn. If inferior spawn is obtained, good results can scarcely be expected. It is therefore advisable to be very certain that the firm from whom this is obtained is reliable ; or if one numbers among one's friends an expert mushroom grower, he will be able, by examining the spawn, to state with reasonable certainty whether or not it is likely to give good results.

Mushroom spawn is sold in the form of cakes or bricks, and consists of manure and other material impregnated with the mycelium of mushroom. If the spawn is not of good quality, no matter how much care is exercised in preparation for the crop, failure must result. It is also important that fresh spawn be obtained. It may, however, be kept in good condition for some time in a dry place which is cool and dark.

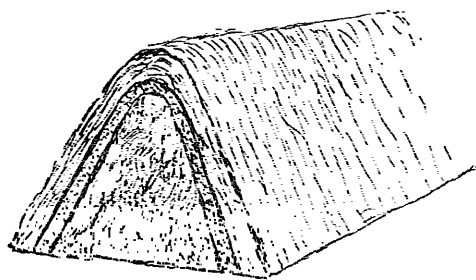
When it is required for use, the cakes of spawn are broken into lumps about as big as an egg and inserted in a proper manner in the prepared beds.

MAKING AND SPAWNING THE BEDS

The position of the beds for outdoor culture is not important, except for those required during the heat of summer. The

latter should be placed in a cool position. The soil on which the beds are to stand should be well drained or, failing this, a foundation bed should be raised several inches above the general level of the soil to ensure that no stagnant moisture will be likely to accumulate.

The bed itself should consist of horse manure, which should have most of the long straw removed. Horses from the stables of which the manure is obtained should, by preference, be fed upon hay or corn. There are two methods of making the beds. One is to take the manure directly to the site and make a bed



Part of a ridge Mushroom Bed.

of the right size and shape, then take this to pieces at intervals of a few days, and re-make it, placing the manure which was on the outside of the bed on the inside. This will have to be repeated several times, both for the purpose of sweetening the

bed and ensuring equal fermentation.

The second and better method is to prepare the manure before making the beds. This may be done out of doors, but if a dry shed with ample ventilation is available, so much the better. It does not matter if the shed is open on one side so long as it is dry. In this the manure should be spread about 2 feet thick and turned over daily for about a week; afterwards, for another fortnight, turning it over at intervals of three or four days. It should then be ready for use.

The width of the bed is not material. Some growers prefer a bed 2 feet 6 inches wide at the base; others make their beds 4 feet in width, while still others make the beds 6 feet in width at the widest part. For convenience, however, 6 feet is probably somewhat too wide.

As the manure is placed in position it should be made thoroughly firm by treading and by ramming, further quantities being added as soon as the lower layers have been made sufficiently firm. The bed, when completed, should be ridge shaped, with a broad top, and the sides should be neatly shaped

before completion. A little time should be allowed before spawning, as the heat rises first of all in the bed, but this rise is not long maintained. When the temperature has fallen to between 70 and 80 degrees, the bed will be in the right condition for spawning. The bricks or cakes should be broken up to the size advised earlier. These pieces should be inserted in the bed at regular intervals, about 8 or 9 inches apart each way, until the whole of the sides of the ridge have been dealt with. It is not necessary to bury the pieces of spawn deeply. If they are covered to a depth of 2 or 3 inches, that will be sufficient. After spawning, the beds should be covered with litter and left alone for a week, after which they should be covered with soil.

SOIL

The quality of the soil used for this purpose is important. Best of all is the top spit of old pasture land which has been stacked grass side downwards for several months. Before being used, this should be chopped up and passed through a sieve. The litter should be removed and should be placed on the ridge, the thickness of the soil at the base being about 2 inches, while from $\frac{1}{2}$ to 1 inch will be sufficient at the top of the ridge. Some practice will be necessary to place the soil properly in position; it should be rather moist, and should be firmly pressed down. After covering with soil, a quantity of clean litter should again be placed over the bed.

The mushroom harvest should begin about two months after the beds have been spawned. Beds during the autumn will take longer coming into profit. This will not occur, however, if the temperature of the beds has been allowed to fall to too low a level. The most effective way in which the temperature of the bed can be regulated is by covering with a fair thickness of fresh manure. Should the temperature rise too rapidly, part of this covering should be removed. During winter the covering will certainly need to be thickened.

Water will be a necessity during dry weather, and it is important that this is carefully applied. It should be given once or twice a day, and should be given as a fine spray. It is better also if the temperature of the water has been slightly raised, so that while it is not warm it is not quite cold. After watering, the litter or outside covering of manure, which should have been

removed, should be at once replaced so that evaporation is not too rapid, as this has a tendency to lower the temperature too quickly ; and should this fall below about 50 degrees, the mushroom rooms will cease to make growth.

BEDS UNDER COVER

Flat beds may be made in barns, cellars, as well as in greenhouses. During cold weather the beds will need to be thicker than will be necessary for beds made in the summer.

Beds made in greenhouses will not need to be made as thick as will those in a cold shed or a cellar. Mushrooms may be grown in pits or frames ; in fact, almost anywhere if the bed is carefully prepared and good quality spawn is obtained. To make the greatest use of sheds and outhouses, shelves may be arranged on the walls of these so that several beds may be made on each side of the shed and the space available may be put to the most profitable use.

Spawn may also be inserted in various places in suitable pasture land. No matter where the spawn is inserted, the treatment of beds is the same, though when grown in pasture it is left to take its chance.

Houses may be built specially for the cultivation of mushrooms. These should have a roof of thatch, and while it should be possible to admit light, the crop will do better in the dark.

GRADING AND PACKING

Mushrooms may be graded as they are gathered. The largest size is placed in one basket, stalks downwards, and smaller mushrooms are placed in another basket.

It is usual to go over the beds every two or three days. Care should be taken not to expose too large a part of the bed at once or to leave any part exposed for too great a length of time. Mushrooms should not be cut, but should be broken carefully ; neither should the stumps be left in the bed. Broken or damaged mushrooms should not be packed with those which are undamaged.

PESTS AND DISEASES

The diseases and pests to which mushrooms are subject are not numerous ; nevertheless, they are at times the cause of more or less serious loss to growers. At times they are attacked by

a tiny fungus, which causes the stem to swell and prevent proper growth.

Mushrooms showing signs of attack should be taken up and burnt.

If mushrooms growing indoors are affected, it may be necessary to spray the interior of the house with sulphate of copper at the rate of 8 ounces of this to $7\frac{1}{2}$ gallons of water.

Mushroom beetles damage the crop by eating part of the mushrooms, both young and old, and so rendering them useless for sale.

Smear slates or cloths with some sticky material, or with tar, and lay these on the beds. The beetles will be caught on these. If a piece of liver is also placed on these a great many more will be caught, as this food has a great attraction for these pests.

Mushrooms are attractive also to two kinds of wood-lice—the flat wood-louse and the sow-bug or pill wood-louse. These pests feed largely upon the undersides of the mushrooms and, if disturbed, roll themselves into a ball.

When not feeding, these pests hide among rubbish; so that all rubbish should be cleared away from the vicinity of the beds, and destroyed. If the mushrooms are grown in a house, hot water may be poured into all cracks and crannies into which these pests would be likely to take refuge.

Traps consisting of flower pots filled with hay may be laid about, being turned out, and both rubbish and pests destroyed from time to time.

Another enemy of the mushroom is known as the mushroom pest. It is often responsible for a good deal of damage to the crop. After the soil has been put on beds, dissolve 1 ounce of salt in $\frac{1}{2}$ gallon of just slightly warmed water and sprinkle the beds with this mixture.

CHAPTER XVII. ONION

§ THE ONION

GENERAL CULTIVATION

THE onion is a popular vegetable, and although with careful cultivation it may be grown on almost any soil, success does not always follow the cultivation of this crop.

During certain seasons, with very little attention, the onion bed will prove all that could be desired ; during other seasons, in spite of the most careful cultivation, the crop will prove more or less a failure.

The ideal soil for onions should not be too heavy ; it should, however, be of the best possible quality. Unfortunately, not every one is possessed of such soil, but with the aid of suitable and thorough manuring this crop may be grown on even a poor soil.

Early cultivation of the soil is very necessary, so that it may be thoroughly weathered by exposure to frost and other conditions of winter. At this time the soil should be deeply dug, but left in a rough condition. During the early part of the new year, ridges which have been thrown up in the autumn should be levelled ; the soil should be broken, raked, and if necessary rolled to get it into as suitable a condition to receive the seed as possible. Among other preparations, drainage should not be neglected if at all necessary. Nothing will so much prevent success with the onion crop as will badly drained soil or land in which there is a proportion of stagnant moisture.

Onions may be sown during various months and seasons in the year. In warm districts spring sowings are made during January and February ; but where colder conditions prevail, March or April will be a more suitable time for making the first sowing. In most districts March and April are the most suitable months for sowing. The soil should be fairly dry before the seed is put in, and if a dressing of soot or lime can be applied when preparing the soil just before sowing, the crop



Thinning out the Onion Bed.

| *To face p. 106.*

will benefit. Wood ashes may be applied at the same time with advantage.

The most satisfactory arrangement for sowing is to divide the soil to be devoted to this crop into beds from 4 to 6 feet in width with an alley about 1 foot or $1\frac{1}{2}$ feet in width between each bed. Some growers, however, prefer to grow the onions in one large plot, without division into beds.

The advantage of dividing the land into beds is that the work of cultivation in connection with the onions is much more easily carried out if the land is divided in the manner described. Drills should be drawn out about 10 inches to 1 foot apart across the beds rather than along them. The drills should be as shallow as possible, so that the seed is only slightly covered with soil. Thin sowing is advisable, but sufficient seed should be sown to permit of thinning when the young plants come up. After sowing, the seed should be firmly trodden in, and the bed should be raked.

As soon as the young onions are up, the soil should be moved by means of hoeing. This not only keeps the plot clean of weeds, but also helps growth markedly.

Sprinkling fresh soot on the beds from time to time, if this is obtainable, will also be of assistance.

Thinning should be carried out carefully as soon as the young plants are visible. A small hoe may be used for this. Later it will probably be necessary to thin again. This final thinning may be left until the young onions are large enough to be of use in salads.

The damage done by the onion fly is sometimes so serious that little, if any, thinning is necessary.

The distance apart which onions should be left in the row will depend to some extent upon the size the bulbs are required. Not every grower requires these of really large size, especially as the quality is often better when the bulbs are of only medium weight.

Two or three weeks before they are ready to harvest, the tops should be bent over, all being laid the same way. This turning down of the tops serves a particular purpose.

It sometimes happens that weather conditions are not suitable for the crop to ripen without assistance. This bending down of the tops gives just the check to the growth needed to bring the onions to the ripe stage. Should the weather towards

the end of the growing period prove dry and warm, it may not always be necessary to turn down the tops in the manner described; but it is always advisable to be on the safe side, and by doing so no risk is taken.

HARVESTING

Harvesting is an important operation with almost any crop, but with few vegetables is it of such importance as with the onion. Dry weather should, if possible, be chosen for lifting this crop, and should such prevail the bulbs may be left on the beds with their roots towards the south for a week or more to dry before being collected for storing. In this uneven climate, however, it is not always possible to rely upon settled weather at the time of harvest. Should there be any doubt as to weather conditions, the onions should be placed out of doors during fine days, and covered or placed in an open shed at night. A big crop cannot, however, be treated in this way. Should the onions be left out of doors after gathering, it is advisable, if possible, to turn them once or twice during the time they remain in the open. A good deal as to the methods adopted must depend upon the quantity grown. It will be possible to deal with a small patch in a much more thorough manner than can be possible with two or three acres.

Before storing, the onions should be sorted, those that are still green being placed by themselves for early sale, the remainder being kept as long as desired if properly looked after. The simplest way to store these is to spread them out two or three deep on the floor of a dry shed. A method which takes up far less space, and which is just as effective, is to bunch or to string them up and hang them in the shed, or even outside, if the sheltered side is chosen and they are protected by an overhanging roof. It should be remembered that while stored onions will take no harm from a slight frost, a severe frost will cause serious injury. Should they be stored outside in the manner described, they will need removing indoors during severe weather, and may be hung outside again as soon as milder weather prevails.

If stored in a heap they are liable to sprout if exposed to light, or if at all damp. The best way to prevent this is to store in a thoroughly dry shed and to cover the heap with clean bags or with a cloth. In spite of all precautions, conditions may be such that sprouting will take place. As soon as this is noticed

they should be topped and tailed, and carefully stored one layer thick on the floor, or placed in shallow baskets.

Another method of storing is to place the onions after they have been left a few days out of doors to dry in shallow wooden trays, such as potato chitting boxes, as air can circulate freely among these boxes when stored one on top of the other. This is a very convenient method of storing large quantities if the trays are available. Onions stored in this way will keep for quite as long, and often longer, than those which are stored in any other manner.

§ PICKLING ONIONS

The very small bulbs from the main crop will, in the ordinary way, be chosen for this purpose. On certain soils, however, where it is difficult to obtain large onions with the most careful cultivation, seed is sown with the object of obtaining a crop suitable for this purpose. The varieties chosen should be the white or silver kinds, and after preparation in the usual way the seed should be sown broadcast fairly thickly. As the object is to obtain as large a crop of small onions as possible, no thinning should be done, but the bed will need hand weeding once or twice. Apart from this, it will need no attention at all until the crop is ready to gather.

§ LATE SOWN ONIONS

Onions may be sown during July and August as well as during the autumn. The earlier sowings are made for use in the autumn and for salading, while autumn sowings are made so that there may be a supply of onions during the following spring and summer.

Those sown during July or August will need thinning as soon as possible, to give the young plants every opportunity to develop.

Autumn sowings should not be made sufficiently early for the plants to run to seed, as may happen unless care is exercised; but they should be early enough to be of use before winter sets in. As the climate varies so considerably, it is advisable to make two sowings—the first during the last week in August and the second during the first week in September. It may

be necessary in cold districts to make each sowing about a fortnight earlier than this. The plants should be thinned, and the thinnings may, if desired, be transplanted during the following spring. If the soil has been well prepared and the drainage is good, almost any variety may be successfully grown in this way.

EXHIBITION

Onions for exhibition are usually sown in shallow boxes and started under glass, after which they are transplanted to specially prepared beds. Sowings should be made during January, although there are successful growers who practise sowing about a fortnight earlier than this. As a compost for use in the boxes, rotten manure is used at the bottom, and a good loam, well firmed down, forms the top layer.

The young plants should be given as much light and air as possible, and when slightly over 1 inch high, transplanted to other boxes containing a similar compost. When transplanted to these second boxes they should be given a space of 3 or 4 inches each way. The newly planted onions will need careful watering. Rain water which has been standing in the open will prove the most satisfactory for this purpose.

The beds to which the young onions are to be transferred should be thoroughly prepared in the manner already described; only it will be an advantage if the soil is more deeply dug.

April is the best month for planting out, but a damp day should be chosen for the work. Ample room should be given to each plant, as well-shaped large bulbs of good quality are the aim. The rows may be about 15 inches apart, and the same distance may be allowed between the plants in the row. The greatest care should be exercised in planting, and the beds should be watered regularly until the young plants are established. A dressing of soot from time to time will also prove beneficial.

During June the young onions should be fed with one of the artificial manures suitable for the purpose, and applications of liquid manure should be made at night at regular intervals. Care should be exercised that feeding is stopped sufficiently early to prevent splitting.

The beds should be kept clear of weeds, and the surface soil of the beds moved by light hoeing occasionally.

MANURES

The manurial treatment of onions for exhibition purposes has already been dealt with. To the commercial grower the feeding of commercial beds is perhaps of the greatest importance.

Liquid manure is one of the most useful foods to apply to the onion bed. Nitrate of soda is useful, but rather dangerous. Once again it is better to rely upon one of the specially prepared manures, of which there are many suitable for onions on the market. The reason is that these manures contain all that the onion needs, combined in the correct proportions, to be of the greatest use.

It is very important, however, that the directions for use be very closely followed. Failure sometimes results from neglect to follow instructions of this description.

PESTS AND DISEASES

Although with careful cultivation the onion crop may generally be brought to successful maturity, this vegetable is subject to quite a number of pests or diseases, and sometimes, in spite of the greatest care, the crop is partly, if not altogether, ruined by some such attack.

The maggot of the onion fly or onion grub is one of the worst pests to which any crop could be subject. Often the whole of the plants in a bed are destroyed. Its presence may be known by the leaves falling to the ground and turning yellow.

The maggot attacks the roots of the young plant before it has reached the bulb form, and also attacks it in its bulb stage. The eggs from which the maggots are hatched are laid on the necks of the young plants by a grey-coloured, two-winged fly, the body of which is covered with fine hairs. About six or eight eggs are laid on a plant, and the eggs take about a week to hatch; the young maggots at once begin to feed upon the plant.

The best remedy for this pest is its prevention, as once a bed is attacked it may be necessary to change the site of the onion bed. It may be remarked here that the onion is one of the few vegetables that may with advantage occupy the same piece of ground for two, three, or more years in succession.

A mixture of lime and soot raked into the soil when making final preparations for drilling will help to prevent attack, as will also moulding up the onions or drawing up the earth on

each side of the plants. If both of these operations are carried out, it is very unlikely that the young plants will be attacked.

Transplanted onions are not very subject to attack. Should a bed be attacked, all affected plants should be taken up and burnt. To throw them away simply means that the pest still remains to increase, and so cause future trouble.

Spraying with paraffin and soft soap emulsion so that the spray is applied as a fine mist is a useful method of preventing attack, as is also the sprinkling of sand and paraffin over the surface of the bed and washing the mixture in by means of watering.

Onion rust is another serious trouble to which this vegetable is subject; it is a disease for which there is, unfortunately, no remedy, and when it attacks a bed or a plantation of onions the whole crop may be destroyed. All affected plants, which may be known by dark streaks appearing on the leaves, should be pulled up and burned.

Onion mildew also causes serious injury to this crop from time to time. The mouldy appearance of crops attacked by mildew is too well known to need description. Dusting with lime sulphur in the proportion of two parts of the latter to one of the former, which should be slaked, is the best preventive. There is no remedy once a plant is attacked. The remarks as to pulling up and burning all affected plants apply to this disease also.

Still another serious disease to which this vegetable is subject is onion smut. Young plants only are attacked, and the disease shows itself by dark spots or streaks on the leaves.

There being no remedy, the only treatment is to pull up and burn all attacked plants as soon as noticed, and not to plant onions on the bed where the disease has shown itself for a few years. One or two years is not sufficient rest for land on which a crop has suffered from this trouble. Onions which are attacked by smut die.

These are the most serious troubles to which onions are subject. In addition, they are at times attacked by eel worms, by scab, and by sclerotinia. In each case those affected should be burned.

VARIETIES

As with many of the most popular vegetables, there are a big number of useful varieties from which a selection may be made.

The most useful onions for general purposes are varieties of the true Ailsa Craig type ; Bedford Champion is also a first-class variety for general use, as is also James's Long Keeping. For autumn sowing, Lemon Rocca and Autumn Triumph are two of the most useful kinds, while Silver Queen and allied varieties are most suitable for pickling purposes.

§ THE POTATO ONION

The peculiarity of this onion is that it is increased in a similar way to the potato. Planting takes place early in the year, and when the young plants are sufficiently grown they are moulded up after the manner of potatoes. The crop is ready for lifting towards the end of June or during July, when the onions should be stored in a dry shed.

CHAPTER XVIII. PARSNIP

§ PARSNIP

GENERAL CULTIVATION

THE parsnip might be much more popular than it is to-day if the public could be shown its value as a food. It is, nevertheless, a profitable crop for the market grower, being especially suitable for those supplying retail shops or doing a local direct trade.

Although this crop may be brought to perfection on most reasonably good soils, and may be well grown on practically any prepared soil, it is easier to grow it well on a good, light loam than on any other land.

Like most of this class of roots, farmyard manure should not be applied to the land when preparing for the crop, but seed should be sown on soil which has been well manured for a previous crop.

Deep and thorough working of the land intended for parsnips is the best possible preparation for the production of roots of good quality. Ground intended for the crop is best dug in the autumn; if this is not possible, the first favourable opportunity should be taken of getting the work done.

Not earlier than the end of February, or some time in March, according to weather conditions, the bed should be prepared by levelling and raking. Seed should be sown in drills about $1\frac{1}{2}$ feet apart and 1 inch deep. Two or three seeds should be dropped in the drills at intervals of about 6 or 7 inches. The soil should be raked over the drills. As soon as possible the hoe should be got to work, and when the young plants have grown to a height of 2 or 3 inches, thinning should take place, leaving the best plants about 1 foot apart in the rows.

After this the hoe should be kept regularly at work, but, apart from this, the bed should need little further attention.

Parsnips need a long season of growth, and although the seed is sown in March, the crop will not be ready to lift until October. It is not necessary to lift and store the roots. They

may safely be left in the ground, and are not damaged by frost ; in fact, parsnips are never at their best until they have been exposed to frost. Should it be necessary to lift and store the roots, this should be done in November. The roots may be stored in a cool shed in light loam or sand, or they may be stored in clamps in the same way as potatoes.

If left on the ground during very severe weather, they should be given a coat of litter as protection. It is only the sharpest frosts that will damage this crop, and during any ordinary frost no protection will be needed.

When lifting parsnips, the greatest care should be taken not to break the roots, and in soils of a rather heavy nature it is best to remove some of the earth before beginning to lift the crop. Should any of the crop be left in the ground during the whole winter, they should be lifted towards the end of February or early in March. Take off the tops and store them in the ordinary way, or place them in ashes out of doors on the coldest side of a wall available for the purpose.

VARIETIES

Hollow Crown is one of the best known and probably among the finest of the different varieties of parsnips which it is possible to grow ; other good kinds are The Student and Dobbie's Main Crop.

PESTS AND DISEASES

This vegetable is not subject to any serious trouble from either pests or diseases. Mildew sometimes attacks the crop, and when roots are attacked they are rendered useless for market. Affected roots will show signs of rotting, and any discovered doing so should be at once burnt.

The yellow jacket grub, the heart and dart moth, and the carrot fly maggot are also at times responsible for damage to the crop.

CHAPTER XIX. PEAS

§ PEAS

GENERAL CULTIVATION

THE position held by the garden pea in the public favour is too well known to need description. From the point of view of the market grower it is no less important. There is, it is true, a certain risk in growing this vegetable on a large scale as a farm crop; but the market gardener cannot do without the crop, and the risk is not so great in his case, because although in some years it is an unprofitable crop, in other seasons it is very profitable. The market gardener also is in a better position than is the grower of field peas, as he is able to grow a succession of peas, and though one or two batches may fail or may meet with glutted markets, this will not be the case with all.

It should not be forgotten also that by up-to-date methods and with the improved seeds available this vegetable may be harvested during the whole summer, from the middle or end of May until October or November.

Peas are also useful from the point of view of intercropping. Not every grower is fortunate enough to possess soil particularly suited to this crop; but peas may be successfully grown on almost any good ordinary soil if proper means of preparation are adopted.

Preparation of the land should begin in the autumn. It should be deeply worked, but it is not, as a rule, advisable to manure for this crop. Thorough manuring should be carried out for a previous crop.

It is important that before sowing, the surface soil be brought to a fine tilth, as this crop does not like a lumpy bed. Early peas should be given a warm, sheltered position, and if a light, sandy loam of good quality is available, this will be an ideal spot on which to grow the crop.

With peas, thick sowing is not advisable. Far better results will be obtained from seed sown thinly, evenly, and carefully than are possible with seed sown too thickly.

Drills to be occupied by this crop need a little attention. The usual triangular section drill is not desirable. The drill should be broad and have a flat bottom. It should be about $\frac{1}{2}$ inches deep. On soils of a heavy nature the seed should not be quite as deeply sown as on light soils.

The first open-air sowings are made usually during November, or in February and March. Many growers prefer the latter dates, as although there are a few days' difference in the time the peas will be ready for use, these few days are almost negligible when the extra risk of loss from sowing peas at the end of the year is taken into account.

It is, in fact, better in the early months of the year to wait until weather conditions are reasonably favourable before planting, as seed planted under such conditions will give much better results than will seed planted under unfavourable conditions.

If there is available a sheltered spot which may easily be protected by artificial means, such as hurdles covered with straw, the seed may be sown at almost any time. Apart from this, the method already advised is preferred.

When sowing main crop peas, plenty of space should be allowed between the rows. Seed is sown during March, April, May, and June. Some growers plant early potatoes between the rows, but where this is done the peas will need staking, and this adds to the cost of production—a consideration when growing for market.

Tender varieties of peas may with advantage be sown more thickly than the hardier kinds, as this will allow for any loss which may take place.

Should the soil be deficient in lime, this should be applied, for the pea is a vegetable which cannot live without an ample supply of this. Even where lime is present, unless it is present in abundance it is an advantage to dress land on which this crop is to be grown with lime from time to time.

It is difficult to apply too great a quantity for this crop, but a useful dressing will consist of about 4 tons per acre.

CROPS UNDER GLASS

Peas may be started under glass either in pots or on a prepared bed. Where this is done earlier crops should result than those which can be obtained by any other means. Frames are usually employed for starting peas in this manner.

Correct-sized pots are most suitable for the purpose. These should be partly filled with suitable soil. A reasonable number of seeds—about eight in a 3-inch pot—should be placed evenly over the surface, and the pot filled with soil. This should be gently pressed down, not heavily, and well watered.

Seed sown in this way and placed in a cold frame during November will produce young plants fit for planting out during the following March. The plants should be planted about 10 inches to 1 foot apart, according to the variety; and so that the roots are not disturbed, the pots should be carefully turned out so that the whole of the soil adheres to the roots.

Planting in boxes or on a prepared bed needs rather different treatment. A turfy loam may be used if boxes are employed for the purpose, or inverted turves free from insect and other pests, may be used.

When ready for planting out, the young plants should be carefully lifted, taking care that as much soil as possible is lifted with the plants. If turves have been employed, these have simply to be moved from the frames with the young plants and laid in the desired position.

Plants grown in this way may need the protection of mats while they are in the frames, during very severe weather. They should be given a sufficiency of air, once growth begins; until that time it is not advisable to admit air too freely.

STAKING

Market growers who grow peas on a large scale, or field-grown peas, are never staked; for this reason the dwarf varieties are much more in demand than are the tall growing kinds by growers for market.

On the other hand, market growers doing a direct trade as well as private growers, often find it advisable to give the peas the support of stakes, or at least of feathery sticks.

The peas should first of all be earthed up. This is done when they are only a few inches high by drawing a little earth to each side of the row.

Stakes employed should be firmly inserted in the ground a few inches from the plants. The stakes should be upright, or leaning slightly outwards. A great many growers of experience lean them towards each other so that they meet at the top. This is a mistake, as peas like all the light and air available,

and anything which tends to crowd the plants will do a great deal of injury.

Sticks should be sufficiently tall. Peas have a habit of growing rather taller than they are expected to do, so that allowance should be made for this.

EXHIBITION

Peas intended for exhibition should be grown in the way already described, only cultivation should be more thorough. It is also a great help if a dressing of wood ashes is applied to the soil after working. The crop will receive a big amount of benefit from such application.

When it is intended to grow exhibition peas on soils that are not particularly suitable, it may be advisable to take out trenches to a depth of 2 feet, break up the bottoms of these and fill with a suitable compost which should be prepared from the most suitable materials available.

Exhibition peas should be given as much space as possible in which to develop.

MANURES

Suitable manuring and the assistance of fertilisers will help peas very markedly. Lime has already been mentioned as being absolutely essential to the successful production of peas for any purpose whatever. Too much rank farmyard manure will do more harm than good. It is true that the plants will grow up strong and healthy in appearance, but that will be because the nourishment has caused an over-abundance of foliage rather than a reasonable quantity of pods to develop.

Manuring heavily for the crop before peas is recommended, as by this means the peas will receive a good deal of benefit.

Both sulphate of potash and superphosphate may be applied at sowing time with great benefit, as may also a small quantity of bone meal. About 1 cwt. of sulphate of potash will be sufficient per acre, while about three times that amount of superphosphate will prove useful. The two manures may with advantage be used together. Basic slag is another useful manure to apply to this crop, and it is particularly suited to soils of a heavy nature; about 4 or 5 cwt. per acre will be a suitable dressing.

The roots of peas are so formed that they can help themselves

freely to nitrogen to supply their needs. For this reason it serves no useful purpose to apply this in the form of a fertiliser, although some growers state that an application of nitrate of soda will to some extent improve the taste of the peas. It will certainly not do any good so far as cropping capacity is concerned.

VARIETIES

Peas may be had both tall and dwarf growing. The latter are the most suitable for the market grower. Varieties may also be obtained suitable for all seasons.

Among the best early varieties are included American Wonder, which grows about 1 foot high; English Wonder grows about $1\frac{1}{2}$ feet in height; Little Marvel grows to 2 feet in height; May Queen is a little taller than this, growing 3 feet high; Ancer is 2 feet 6 inches in height; Bountiful is 2 feet 6 inches in height also, and Pioneer 1 foot 6 inches. This by no means finishes the list of excellent early kinds, but those mentioned are all reliable.

Second early kinds include Gradius, which grows 3 feet high; Senator, 2 feet 6 inches; King Edward, 2 feet 6 inches; Stratagem, 2 feet; Prizewinner, 3 feet; and Passport, 2 feet 6 inches.

Main crop include Duke of Albany, 3 feet 6 inches; Eureka, 3 feet; Alderman (a favourite with many), 5 feet; and Magnum Bonum, 3 feet 6 inches.

Late kinds include Gladstone, 4 feet; and Clory of Devon and Autocrat, 3 feet.

PESTS AND DISEASES

Among the natural enemies of peas, mice are often troublesome. Red lead is a useful preventive for these pests, the pea being first soaked in water and then stirred in red lead. They may be sown as soon as they are dry.

Sparrows are also the cause of loss from time to time. The best way of keeping these at a distance is to dust the young peas with lime and soot from time to time.

The pea maggot is a pest known to every one who has grown or who has eaten peas. Actually this maggot is the caterpillar of one of the tortrix moths. Eggs are laid during June on young pods; the maggots from these eat their way through

the pods and feed upon the young peas. The maggots leave the pods when full grown and enter the earth, where they encase themselves in a cocoon. These pests attack main crop and late peas, sometimes doing serious damage.

Soot sprinkled over the foliage early in June will prevent the moths laying their eggs on the plants to some extent.

Pea weevils often cause serious loss to the grower. They take away nourishment from the plant by devouring part of the leaves. A mixture of sand and paraffin on each side of a row of peas will prevent attack.

Black root rot is a disease which attacks the lower part of the stems and the roots. As it attacks plants when young, it is liable to do a good deal of damage. Affected plants, which may be known by the yellowing of the foliage, should be taken up and burnt.

The pea and bean thrips does a good deal of damage at times to the flower buds of peas; it also attacks in a similar way runner beans. Eggs are laid on unopened blossoms, and between a week and a fortnight later the larvæ appear. These feed upon parts of the flowers, destroying them in the process.

Liming and deep digging the soil in the autumn will help to lessen the danger of attack. Pea sticks which have been used during an attack should be destroyed. There is no real remedy at the time of attack.

Pea mildew is sometimes very serious. It is a form of powdery mildew. The result of an attack by this disease is first seen in the yellowing of the leaves, which afterwards become coated in the well-known way which mildew has. The disease is sometimes the cause of the loss of practically the whole crop.

There is no remedy for plants badly attacked. The best way of preventing the disease from spreading is to pull up the badly affected plants in the rows and burn them.

CHAPTER XX. POTATOES

§ POTATOES

GENERAL CULTIVATION

THERE is no vegetable crop of such importance as the potato. It is, nevertheless, not always the most profitable vegetable to grow, although it is always in demand. This vegetable possesses one very big advantage over many others because it is a cleaning crop ; that is, planted on land which has become foul with weeds owing to the difficulty of cleaning while that particular crop was occupying the soil, the land will be naturally cleaned during the process of growing a crop of potatoes on it.

There is scarcely any soil to be found in gardens which is not suitable for growing potatoes for one purpose or another.

The methods of potato growing in different districts vary considerably, depending largely upon soil and situation. In one district it is the practice to cater for the early market ; in another the seed potato trade is the main consideration ; while in still another district potatoes grown in the more usual way for the table are the main consideration.

Potatoes will grow on a wide range of different soils. It is true that certain soils are more suitable than are others, but even where soils are more or less unsuitable they may, by means of good preparation and cultivation, be induced to produce very fair crops.

Among the many varieties of potatoes from which the grower may choose, some are hardier than others, while some again are better able to resist disease. It must be remembered that the demand for certain varieties is much keener than for others ; that varieties in favour change from time to time and for one cause or another. The grower who takes these points into consideration before planting will probably arrive at better results than will the grower who neglects to consider matters of this kind.

It has already been stated that this vegetable will grow on a wide variety of soils. It is important, however, that land on

which it is intended to plant should be well drained : stagnant moisture will ruin the chances of any crop. It must not be forgotten also that the kind of soil on which the crop is grown will definitely influence the quality of the crop.

Autumn preparation of the soil is the best for the main crop, and at the same time a good dressing of farmyard manure should be applied and worked in. On a big scale most of the preparation is carried out by means of the plough, with horses and tractors ; but the market gardener prepares his land by hand digging, and in this he has the advantage, for however good a ploughman may be, soil prepared by hand digging, if the work has been well carried out, is in better condition to receive the seed.

Bastard trenching is advisable from time to time, and it is always the best method of dealing with pasture land which is being broken up for this crop. When grass land is being broken up, however, care should be taken to minimise as far as possible the risk of loss by wireworms and other pests which are so often found in large numbers under such conditions.

Bastard trenching consists of removing the top spit across the land to be worked to a width of about 2 feet, breaking up the soil beneath this, and it is advisable for potatoes to work in any manure that is to be used at the same time.

The surface spit from the next strip of soil is then turned over on to this, leaving the under soil exposed for similar treatment.

The soil from the first spit may be carted to the other end of the plot to fill up the last strip, which will otherwise be left open. A better method, however, and one which saves a good deal of labour, is to divide the plot into two, lengthways. Remove the soil from the first strip half-way across, that is up to the dividing line, and move it just over the line in readiness for use. Continue the work in the same manner down the half of the plot on which work has been begun. When the end of the plot is reached, begin working the other half of the plot from the opposite end, moving the soil from the first spit to fill up the last trench of the first half of the plot. When the last trench of this half is reached, the soil from the first trench opened when digging will be waiting to fill it in.

On light soils it may be an advantage to leave digging or ploughing until the spring.

When possible, the rows of potatoes should run from north to south. If they run from east to west, only one side of the row gets the advantage of full sunlight, whereas if the rows run in the direction indicated, both sides will get their fair share, which will make a very big difference to the health and productiveness of the crop.

Potatoes may be planted in furrows made with a plough, or in trenches made with a spade. On light soils the dibber is useful; in fact, better results are often obtained by this method of planting than by planting in trenches.

A useful and time-saving method of planting potatoes in trenches for the market gardener is to dig the first trench, place the sets in this, and fill it up with soil from the second trench. If a girl is available to set the potatoes, this is a very speedy way of getting the work done.

Selection of seed is important. Large seed will not, as a rule, produce such good results as will smaller tubers. If large potatoes only are available for seed purposes, these should be divided. Seed of good quality should not need such division, and where obtainable, as it is in most cases, it should be planted in preference to larger seed.

It is not always convenient to sprout the seed for the main crop in boxes before planting. Where it can be done, however, it is an advantage to do so. It is, in fact, better to plant sprouted seed a little later rather than to plant ordinary seed at the usual time. The reason is that a better root system is formed by sprouting, which results in healthier and more productive growth.

Whether or not the same variety of seed is grown, a change of seed, that is seed from a different soil and with somewhat different weather conditions, should be obtained every third year at least. Many growers prefer to obtain new seed every year, and undoubtedly under certain conditions it pays to do so.

There is a rather common practice of cutting a small piece off seed potatoes when they are planted, so that decay of the tuber should be more rapid. The idea is that as soon as the young plant begins to make growth, the quicker the old potato rots, the better the result will be. In the writer's opinion this practice has nothing whatever to recommend it.

The distance apart which potatoes should be planted varies considerably. It is very necessary to make full use of the space

available ; at the same time, nothing is gained by overcrowding, and a good deal of loss usually results where the sets are planted too closely together.

At present we are dealing with main crop varieties, and a suitable distance apart for these is from 2 feet 6 inches to 3 feet between the rows, the sets being from 1 foot to $1\frac{1}{2}$ feet apart, according to the vigour of the variety. Main crop potatoes should be covered to a depth of from 3 to 4 inches. If a greater quantity of soil than this is put on, the potatoes will suffer.

As to the time for planting, this will vary with the district, soil, and situation to some extent. Potatoes for the main crop are usually put in towards the end of March or early in April. The latter period is sufficiently early in most districts. Good crops of potatoes may be planted during July ; but not often any advantage is gained by planting at this time, unless it is possible to clear the land of some crop in time for earlier planting.

Although occasionally potatoes are planted on the same piece of land twice following, with successful results, it is advisable to give them a fresh piece of ground each year if at all possible. A rotation of cropping should be followed which should prevent this crop from occupying the same soil more than once in four years.

Apart from the methods of planting potatoes in furrows or trenches and dibbing in on the flat, there is one other method which, under certain circumstances, has something to recommend it when planting on damp soils. Beds are made about $1\frac{1}{2}$ yards in width, having trenches between them, and by this means good drainage is assured. Two rows of potatoes are planted on each bed. One row is about 1 foot or $1\frac{1}{2}$ feet from one side, the other row being the same distance from the other side of the bed. When planting, the sets are simply laid on the surface the correct distance apart in the rows. The trench between the beds is formed by taking earth from between the beds for the purpose of covering the potatoes ; later again more earth is taken, when the time for earthing up arrives. This method, which is known as the "lazy bed" system, gives very good results under such conditions as have already been described. Apart from such conditions, it has nothing to recommend it.

Hoeing should take place both between the rows and between the sets as soon as the plants show sufficiently to make the work possible. It is necessary to get the crop as clean as possible during the early stages of growth, because when they have grown to any extent, hoeing is best left altogether alone, or damage and loss may result.

Earthing up will need to be carefully done. It is quite possible to earth up too freely, in which case a lighter crop will result. Earthing up, if properly done, has a tendency to check damage by blight, although once a crop is badly attacked there is no remedy. The best treatment is to delay attack until it is comparatively harmless, by spraying two or three times.

SPRAYING

During recent years it has been proved beyond doubt that spraying at the right time and in the right way will do a good deal towards preventing injury by blight. There are both dry sprays and wet sprays, but wet sprays are usually more effective if applied in the form of a fine mist. Potatoes should be sprayed at least twice; many growers spray three times, at intervals, during the growing period. Bordeaux mixture is the material usually employed. This consists of copper sulphate, lime, and water. The following particulars of making and applying this wash are taken from "Practical Spraying." *

"In order to make this wash, 25 gallons of water are placed in a large tub, and in this soak 5 lbs. of powdered copper sulphate. A simple method is to first tie the sulphate in a piece of sacking and then hang it below the surface of the water.

"Two and a half pounds of lime is then placed in a wooden receptacle and carefully slaked, the water being added very slowly until about a quart altogether has been used. As soon as the lime is slaked, add another quart of water and well stir the mixture. Still more water may then be added until the lime water resembles cream in appearance.

"The lime water is then carefully strained through sacking into an empty tub, and water is added until the tub contains altogether about 25 gallons.

"This lime mixture should then be slowly poured into the

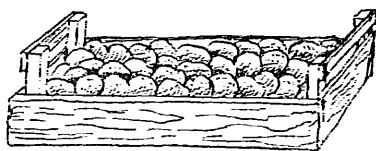
* "Practical Spraying," by J. W. Morton. Published by Messrs Ernest Benn. Price 2s. 6d.

tub containing the copper sulphate and water, but not until the copper sulphate hanging in the bag has completely dissolved. The mixture should then be thoroughly stirred, this operation taking some time to do thoroughly.

"In order to prove effective and to act without damage to potato plants, the wash needs very careful mixing. There should be no granular sediment if the wash has been carefully mixed, and if the blade of a knife is put into the mixture, there should be no coating of copper on it when it is withdrawn.

"If such a coating does result, the wash has not been properly mixed, and may damage the crop on which it is used. The remedy is to add more of the lime solution.

"In order that this work may effectively prevent the spread of the disease, it should be sprayed on the crop with a very fine spray, so that it resembles a mist, if possible, as only by these means will the potatoes receive an even and effective covering of the mixture."



Potatoes in trays for chitting.

The wash is used at the rate of from 125 to 150 gallons per acre. Where water is scarce it may be necessary to use a dry mixture applied as a dry spray. To be effective, dry spraying must be done when the dew is on the foliage, but it never gives such good results as are to be obtained by the use of wet sprays.

FORCING

Potatoes may be forced under glass, usually under frames, or if heated pits are available, these may be used for the purpose. If frames are used they should be deepened by an extra board. Dwarf varieties of potatoes are most suitable for this purpose.

The potatoes should first be chitted by being placed in shallow boxes, all but the strongest chits being rubbed off before planting.

On the surface of the soil on which the frames are to stand a good compost about 1 foot thick should be placed, and sets sprouted in the manner described should be planted. For forcing in this way the sets may be planted much closer together than for outdoor culture, especially as only dwarf varieties are

suitable for the purpose. A useful distance apart will be about 15 inches for the rows, the sets being placed about 9 inches apart in the rows. If more vigorous kinds are grown, a little greater space may be necessary each way; but it must be repeated that strong growing kinds are not suitable for this purpose.

Potatoes may also be forced on mild hot beds under frames. The hot bed is made in the usual way, and covered with soil to a depth of from 9 inches to 1 foot. Plant the sprouted potatoes about the same distance apart as when no hot bed is used. The potatoes should be covered with soil to a depth of 3 or 4 inches.

Air should be admitted at first in small quantities, but as the plants make more growth, the amount should be increased. Care should be taken not to expose the plants at nights, as even if only slightly damaged by frost the crop will suffer to some extent. Soil should be added if necessary, but the amount of earthing up should be slight.

It will be necessary to water plants grown in this way from time to time. Watering should be carefully done so that the soil is kept moist without being too wet. Warm water should be used for the first watering, and if further watering is necessary, the water should have the chill taken off.

Potatoes may also be grown in pots and boxes under glass; but for the market gardener this method has nothing in its favour; indeed, the methods described already are better, from the point of view of the owner of a private garden, no less than the commercial grower.

EARLY POTATOES

Potatoes may, under favourable conditions, be planted out of doors early in the year. It will be necessary to select a nice, warm, sheltered spot if it is hoped to harvest the crop undamaged by frost, for even a slight frost will be the cause of a certain amount of injury to the crop. It is only on favourable soils that planting may commence before March. The most suitable soils for early varieties are good quality loams of a light, sandy nature. It is better to plant a week or two later than to run the risk of serious damage by frosts.

The seed should be of good quality and, of course, only early kinds should be planted at this time.

It is advisable to plant rows of early peas as a protection for the potatoes. Other protection will consist of drawing the soil to cover the young shoots as they show through, until there is little danger of frost. In very severe weather further protection should be given. This should take the form of covering with loose litter, which is dry, of any kind available, or mats may be placed over the beds on suitable supports.

HARVESTING AND STORING

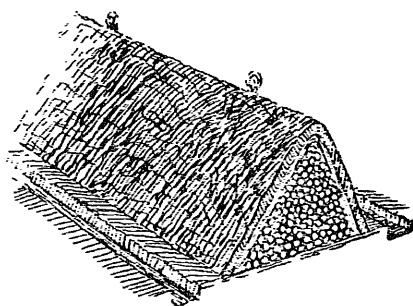
The main crop, when potatoes are grown on a large scale, is usually lifted by means of potato diggers or potato ploughs. Smaller areas are lifted by means of a flat tined fork, care being taken not to "stick" any of the tubers when lifting. A fairly large quantity may in this way be rendered useless by inexperienced diggers.

It is important that no more potatoes are turned to the surface than can be picked up the same day. If left exposed to the air for any length of time the quality of the potatoes will suffer, and a spell of bad weather may set in, making it impossible to pick up within a reasonable time any potatoes which were not picked at digging time.

There are several methods of storing potatoes, but by far the most usual is in a clamp or grave. From the clamp the potatoes, after being riddled to the required size, and bad or diseased tubers picked out, are loaded for market.

It is important, then, that the clamp be in a convenient position. Mostly the nearer the gate the better, though where a dyke separates a field from a roadway, the clamp is often along the dyke, and a temporary bridge of sleepers is thrown over the dyke so that the potatoes may be loaded directly on to the cart for market.

It is important also that a dry spot should be selected for the clamp. The shape of the clamp may be round or oblong, so far as the base is concerned. Where there are any quantity



Showing method of storing and covering.

of potatoes to be stored, an oblong clamp is almost a necessity. The base of a clamp varies from 3 to 5 or 6 feet.

The potatoes are piled in a wedge-shaped heap on the selected spot, taking care to preserve an even width along the heap, and straight sides. They are then covered with clean, dry straw, which should be drawn out something after the manner of straw used for thatching, so that it lies the same way on the heap. A few clots of earth are then placed on the heap to keep the straw in position, and it is left for a short time. A thin layer of earth is then placed over the straw, the earth being taken from a trench dug round the grave. Later, when there is danger of severe frost, a further covering of soil is placed over the grave.

The work of earthing up graves needs a certain amount of skill, the first spadefuls being placed along the bottom of the grave, which is in this way gradually covered from the bottom upwards with an even coat of soil.

Along the top of the ridge air holes should be left. That is, the soil should not completely cover the top ridge, but space should be left here and there. Sometimes the straw is pulled up at these points to look something like a chimney; sometimes one or more small drain pipes are inserted. These holes are for the purpose of ventilation, and they should be placed from 6 to 8 feet apart. The method of lifting the straw slightly at these points is better than the use of drain pipes, as where these are employed, unless they are blocked up, during severe weather there is danger of frost finding its way to the heap.

It is important that the potatoes should be comparatively dry when placed in the clamp. It is also important that few diseased potatoes be placed in the clamp, or these will affect the sound ones round them until a big proportion of the potatoes in the heap are affected. Where it is thought that potatoes are going bad in the clamp, this should be opened and the potatoes riddled over to remove all which are not sound.

Where only small quantities of potatoes are to be stored, these may be kept in a dry, frost-proof shed.

Early potatoes are not usually stored, but are marketed as they are dug.

BREEDING POTATOES

This is a specialised occupation, needing great skill and patience, with long experience. Selection of varieties for cross fertilising is another matter of the greatest importance. The method of hybridising or cross fertilising potatoes, as well as most other plants, consists roughly of taking pollen from one variety by the aid of a camel-hair brush and carefully placing this pollen on the female portion of the flower of another variety. Care must be taken to do this at the right time, and also to protect the flowers which are chosen for fertilising from being insect fertilised or interfered with in any way. Seed from plants dealt with in this way is sown, and after a time, which varies with the particular plant, it is possible to examine the result of the work.

After this, however, in the case of potatoes it is necessary to put the new varieties of potatoes which result from such cross fertilisation to various tests, such as their resistance to disease, before it is possible to judge whether or not they are worth bringing before the public, and several years must elapse from the time of hybridising before it is possible to put a new variety on the market.

EXHIBITION

Exhibition potatoes are often merely selected tubers from potatoes grown in the ordinary way. Some growers, however, devote a small portion of soil especially to the cultivation of potatoes for this purpose. The main points of difference in the cultivation of potatoes for this purpose and for market is that greater space should be allowed not only between the rows, but between the sets also. This will ensure the production of nicely shaped tubers of excellent quality and size. Care should also be exercised in the selection of suitable varieties. Only the best varieties should be grown for exhibition.

If a quantity of manure from old mushroom beds is available, dressing of this should be applied to the soil when making preparation for planting. Assistance should also be given by the application of suitable potato fertilisers to the crop.

Tops should be cut off as soon as growth is completed, and the crop carefully lifted and stored in fine sand until wanted. The tubers should be washed at the last possible moment, a wet sponge and soapy water being used for the purpose.

MANURES

There is not the slightest doubt that the weight of potatoes per root can be greatly increased if manure is used. Land on which potatoes are to be grown should be thoroughly manured. The manure may be worked in with the soil, or it may be applied along the furrows or trenches. Well-rotted farmyard manure should be used. In addition to the application of farmyard manure there are, on the market, many fertilisers especially manufactured for the benefit of the potato grower. One of these should be selected from a reliable maker and used in the quantities advised, for farmyard manure alone is usually insufficient to supply all the needs of this crop.

Potato fertilisers should not be allowed to touch the potatoes, or some injury may result.

This is a crop which pays well for generous treatment, and the grower who applies his manure liberally and intelligently, taking into consideration the quality and need of the soil, will reap a reward in abundant crops of good quality tubers when the time for lifting arrives.

VARIETIES

The selection of varieties is a particularly important matter where this crop is concerned. Certain varieties of potatoes do not find a very ready market, while many others, although they meet with a demand, have to be sold at a lower price than it is possible to obtain for more popular kinds. When producing for market, the first test of all is the suitability of the variety for the table.

There is another difficulty with which the potato grower has to contend. Many potatoes are known by several different names.

In "Potato Varieties," by Redcliffe N. Salaman, M.D. (published by the Cambridge University Press), are to be found the names of potatoes with their synonyms; and here we are told that the Up-to-Date is known by over two hundred different names, and Abundance by over a hundred.

It will readily be seen, then, that the grower should exercise discretion in his selection, and if a new variety is purchased, he should go to some trouble to ensure that the tubers purchased are really what they claim to be.

Again, it should not be forgotten that in time the best variety may deteriorate. Potatoes have a habit, perhaps more than most plants, of gradually deteriorating. By change of soil and change of seed it is possible to keep up the quality for a good many years; but even then, after a time the quality begins to decline and the variety loses favour.

Among reliable early varieties may be mentioned Midlothian Early, May Queen, Sutton's Ringleader, and Sharp's Victor. All of these are suitable for forcing as well as for planting in warm positions protected from frost.

Early open air varieties include, among other good kinds, the Duke of York, Gladiator, Ninetyfold, and Early Puritan.

Second early varieties include Windsor Castle, Sutton's Stirling Castle, Sharp's Express, Sir John Llewelyn, and Dalmeny Early.

Main crop varieties include that most popular of all—where it can be successfully grown—King Edward VII., Up-to-Date, Evergood, Superlative, and Majestic.

The names given do not include nearly all the good varieties which may be grown by any of the methods mentioned. They are given rather as a guide to those who have little or no experience. Experienced growers have such a wide choice at command that selection should not be difficult.

PESTS AND DISEASES

The potato is subject at times to serious injury by disease. To such an extent may the crop be damaged that throughout big areas it may be almost ruined. During 1926, in certain parts of the country, blight attacked potatoes to such an extent that the average yield per acre of marketable ware was probably less than 25 per cent. of an average crop.

The value of spraying was proved on this occasion, and so important is this operation that particulars are given under a separate heading.

The most serious disease with which the grower of this crop may have to contend is that known as *Phytophthora infestans*. The disease is more commonly known by such names as potato blight, potato disease, dry rot of potatoes, potato mildew, and late blight of potatoes. It was the disease which was so destructive to the crop in 1926.

Brown patches first appear on the leaves and rapidly spread

until the whole of the tops may be killed within a very short time. This disease is not likely to be the cause of serious damage during a dry season, but when foggy, moist, damp weather prevails, conditions are favourable for the rapid spread of the disease, and it is during such seasons that the most serious damage is done.

The most useful remedy is to spray with Bordeaux mixture, made and applied to the crop as described under "Spraying."

In addition to attack by this disease, there are many other foes of one kind or another which from time to time lessen or damage the crop of tubers. Next to potato blight there is no doubt that wart disease is one of the most serious troubles with which the potato grower has to contend; it is also known by the name of potato disease, cauliflower disease, and canker.

The eyes of the tubers are first attacked. Cauliflower-like growths may grow out of the shoots. These are at first a light colour, but later turn black. This is a disease which does not attack every variety of potato. Immune varieties include such well-known and useful kinds as Majestic, Great Scot, Kerr's Pink, and Golden Wonder.

Unfortunately there is no remedy for this disease, and if diseased tubers are fed raw to stock, the spores by which the disease is spread will pass through the animals unharmed. Potatoes from an attacked crop should therefore always be boiled before being fed to stock, as boiling kills the spores. The disease is much more prevalent in certain districts than it is in others. In the eastern counties it rarely does serious damage. In districts liable to serious loss from this cause, immune varieties should be grown.

Potato fly or potato frog fly is an insect which at times does considerable injury to the foliage of potatoes, thus preventing the tubers from getting proper nourishment. They are mostly to be seen on the haulms during August and September, when, by means of their beaks, they suck the sap from the leaves. In case of a slight attack, no notice need be taken of these insects; but when, as is sometimes the case, they are present in large numbers, spraying with soft soap and quassia will rid the potatoes of their unwelcome guests.

Wireworms, again, are often a source of trouble, especially where the crop is grown on old pasture land which has been turned up. When they are present in the soil in any quantity,

erious damage is done to the potatoes ; in some cases scarcely a potato escapes injury. Usually the greatest damage is done when these pests are present in light soils, as they can move about more freely in these than they can in soils of a heavier nature.

Whenever these pests abound, a good soil fumigant should be worked into the land. It is very unlikely that all will be destroyed by this means, but a very big proportion will be killed.

Naphthalene and lime used at the rate of one part of the former to fourteen of the latter will also prove useful if deeply dug in during the autumn.

On a small scale trapping may be resorted to, but for the market grower it is almost impossible to give the necessary time and attention to deal with the pest in this way.

The plant bug, like the potato frog fly, attacks the leaves of potatoes, and is responsible for a good deal of injury to these by sucking the sap from the foliage. Its body is dark and shiny, and it works in this way during the summer. It is not often that serious loss is caused by this insect, but when a bad attack is threatened the plants should be sprayed with Bordeaux mixture.

Scab is very often the cause of heavy loss to growers, especially in certain districts. There are two kinds of scab to which potatoes are subject—the common scab and the corky scab. It is the latter which is responsible for by far the greatest amount of loss to the grower.

Corky scab is often particularly serious in districts in which there is a rather heavy rainfall. The tubers are attacked by the disease, which at first shows itself in spots, whitish in colour. After the skin of the potato has been broken through, a brown coloured powder appears. Potatoes attacked lose their value in the markets.

Potatoes should not be grown on soil on which an affected crop has been growing for several years. Good drainage is also of assistance in keeping this disease at bay.

Common scab is more common, but much less serious than corky scab. It certainly affects the appearance of the tubers, but does not affect their keeping or eating qualities. An application of superphosphate will do a good deal towards preventing this disease establishing itself.

Dry rot attacks stored potatoes, and where these are affected, diseased tubers should be destroyed.

Other diseases and pests which are not generally serious but which are at times responsible for some loss to growers include leaf curl, the cause of which and the remedy for which is not known. New seeds are not usually affected by this disease.

Rats do a certain amount of damage to stored potatoes at times, while two or three moths, including the ghost swift moth and the death's head hawk moth, are also injurious in a minor degree. There are also one or two less serious diseases which attack crops from time to time.

Those dealt with are, however, the pests and diseases most likely to cause serious loss, and in the case of the worst of the diseases, crops may be almost if not entirely ruined. Every effort should be made to prevent such attack, and a careful watch should be kept for the first signs of such diseases, so that at their first appearance steps may be taken to effectively deal with them.

CHAPTER XXI. RADISH

§ RADISH

GENERAL CULTIVATION

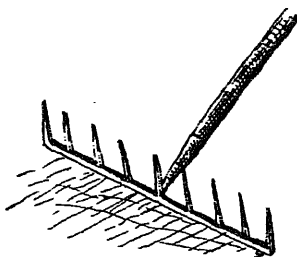
ALTHOUGH the radish cannot be numbered among the most important vegetables, it is one of the most useful and obliging to grow. As a catch crop it is probably used to a greater extent than almost any other vegetable.

Properly grown radishes have a flavour entirely different and very much superior to those which have been badly grown, and in spite of the ease with which this vegetable may be grown to perfection, it is often neglected, with the result that its quality suffers markedly.

Growth should be rapid if good results are wanted. Slow growth leads to coarseness and roughness.

The soil for radishes should be deeply dug and worked to a fine surface. It is a mistake to sow the seed thickly; it should be thinly broadcast over the bed. Radishes sown during the summer should be given a cool spot in the shade, and should the weather prove dry they should be watered from time to time. Almost any kind of soil is suitable if deeply dug, and manure may with advantage be worked in when digging.

Sowings should be made in the open at intervals of about a fortnight during the summer months.



Using back of rake to draw soil over small seeds after sowing.

EARLY CROPS

Early radishes are usually frame grown. A slight hot bed should be made and covered with 5 or 6 inches of soil. Should too much heat be made it will be necessary to wait until the hot bed has cooled down to some extent. Seed should be thinly

sown, and as soon as the seedlings are nicely up the young plants should be thinned to 3 inches apart each way.

The lights should be placed on the frames after sowing, and ventilated freely whenever weather conditions are suitable. Additional protection such as that provided by mats may be necessary during severe weather.

Radishes are not often grown alone in frames in this way. So many crops may be grown with them without injury to either, that most growers prefer to make the best use of their available space.

Early crops on light, warm soil may be obtained if a sheltered position is selected for the bed, and these, after sowing, are covered with a few inches of clean, dry litter to protect the plants from frost.

During mild spells of weather this covering may be removed, but should there be the slightest danger of frost it should be at once replaced.

EXHIBITION

No special methods of cultivation are necessary, but careful selection should be made from the bed, and the best varieties should be grown. The radishes should be gathered at the last possible moment and moistened before they are packed.

VARIETIES

Among the numerous varieties it is not difficult to make a selection of reliable kinds, but it is difficult to state definitely that one variety is much superior to several others.

Suitable forcing varieties include Red Turnip, White Turnip, French Breakfast, and Wood's Early Frame.

For growing in the open, the following varieties are useful, amongst others: White-tipped Long Scarlet, Long White, and The Sutton.

CHAPTER XXII. RHUBARB

§ RHUBARB

GENERAL CULTIVATION

IN certain districts rhubarb is very largely cultivated for market, and in most districts it is grown to a greater or lesser degree. Forced rhubarb is greatly in demand, and this is a plant which, with care, is not difficult to force successfully.

There is one big drawback to this crop from the point of view of the grower. Situated a great distance from market, its weight and bulk make it an expensive crop to get to its destination, thus adding considerably to the cost of production.

Rhubarb grown under ordinary outdoor conditions does not naturally command such a big return as does forced rhubarb. There is, nevertheless, a steady sale for this, and where its cultivation is carried on in the vicinity of a big town, or where a direct trade is carried on, it is a very profitable crop to grow, and it will often answer to lay down a rather big area of land to the cultivation of this crop.

Rhubarb is not difficult to cultivate, but the method so often adopted of planting a few clumps in a corner of the holding and taking no further notice or pains with it except to cover with an old bucket for forcing is not recommended.

The soil on which this crop will thrive is a good quality loam which should not be too dry. The pieces of land on which it is proposed to grow rhubarb should be deeply dug. If possible, it should be trenched. Land for this purpose cannot be too deeply worked, and, when digging, a heavy dressing of manure should be worked in. This should be done during the autumn.

Planting should usually take place during the early part of the year. February and March are the most suitable months, though on very light soils it may be advisable to plant in the autumn.

Rhubarb will not thrive if crowded. It is therefore advisable to allow the plants ample space in which to extend. It is true that certain varieties do not cover as much ground as do other

kinds, but the best way in which to ensure such plants having ample space is to plant sufficiently far apart to allow a catch crop to be grown between. This will also ensure the soil between the plants receiving proper attention.

From 4 to 5 feet apart in the row, with at least 5 feet between the rows, will be sufficient distance for most varieties. A few kinds may be planted somewhat nearer together than this.

Single crowns should be planted. The soil round must be thoroughly firmed after planting. It is not advisable to plant too deeply. When large quantities are to be planted, a furrow is sometimes thrown out for the purpose, but individual planting of the roots is to be preferred. After planting, it is advisable to give a mulch of manure, and this may be dug in when growth begins.

It is usual to propagate rhubarb by division of the roots, or, if desired, plants may be purchased for the purpose. Care should be taken, when dividing up old plants, that each plant is divided into as many parts as there are crowns to it. It is a mistake to leave more than one crown on any division.

After planting, no sticks should be pulled the first season. When flowers begin to show, the flower heads should be removed. The second season a light crop may be harvested. It is well to give the plants every chance by dealing lightly with them until the third year.

It is too often the practice to continue pulling rhubarb until too late in the season. This is a mistake, as the following season's crop suffers.

Rhubarb may, if desired, be grown successfully from seed; but this method is not recommended except under special circumstances. Sow the seeds thinly in rows during the very early spring. The rows should be about 1 foot apart, and the weakest of the young plants should be thinned out so that those which remain stand about 1 foot apart.

The following February the young plants should be ready to set out in their permanent positions in the manner already described.

FORCING

Both general cultivation and the cultivation of forced rhubarb has been carried on very largely during recent years, and the business continues to grow in districts in which soil and other conditions are suitable.

When forced rhubarb is grown on a large scale, special sheds are erected. These sheds, which are 7 or 8 feet high, are built of wood or brick, the former material being most commonly employed. The roofs are covered with felt and earth. These sheds are artificially heated; in some cases by an arrangement of hot water pipes, which is the most economical method in the long run, as a considerable amount of labour is saved. Others are heated by means of an arrangement of earthenware pipe lines connected with fireholes.

Roots which have been growing out of doors for about two years are used for forcing. These are lifted during the months of November or December, and planted very closely together in the sheds. While growing out of doors no sticks have been taken from these roots. These plants will be ready for pulling within a few weeks, when the sticks are tied in bundles by hand or by machinery and packed in boxes for market.

After the full complement of sticks have been gathered from forced roots, these are replanted out of doors, where they remain for a further two years without interference. At the end of this time they are again removed to the forcing sheds.

Other methods of forcing consist of making a bed of manure covered with soil in an unheated shed and planting the roots in these. Usually sacking is hung from the roof of the shed to keep out the light, as although it is not necessary to force rhubarb in the dark, it is generally considered an advantage to do so.

Still another method is to force the plants as they grow. For this purpose also the plants should be planted closely together, more so than for ordinary cultivation. Boards are placed on edge round the plants to be forced. A trench is dug round the outside of the boards, and hot manure is filled into the trenches and heaped round the boards. The boards are then covered with some kind of protecting material, or a good thickness of litter is spread over the plants to keep frost at bay.

One advantage of this method is that if the boards and manure are removed sufficiently early, and the rhubarb left untouched until the following season, it may be forced in the same way for some years in succession.

EXHIBITION

If rhubarb has been carefully grown and given ample supplies of water, with the advantage of liquid manure from time to

time, the chief work will consist in the selection of suitable sticks. These should be straight, of even thickness, and of good colour; the leaves should be cut off, leaving an inch or two of the base of each leaf on the stalk. The sticks should be washed with the aid of a sponge and clean water, and very neatly tied into bundles of six, using raffia for the purpose.

MANURES

It will be gathered from what has already been written that it is difficult to give too heavy a dressing of farmyard manure to land which is to be occupied by rhubarb. In addition, there are several fertilisers which may with advantage be used, the choice being made according to the special conditions under which the crop is grown.

Nitrate of soda is beneficial if applied to this crop in the spring. About $2\frac{1}{2}$ cwt. per acre will be found sufficient. The fertiliser is particularly suitable for early varieties.

Kainit and superphosphate may be used together in equal quantities in the autumn, if desired, together with the farmyard manure. This mixture may be usefully applied before planting.

A liquid manure may be made by mixing 1 lb. of kainit and 1 lb. of superphosphate with 8 gallons of water. Basic slag and kainit may also be applied to the soil with the farmyard manure before planting, if desired. If this is done, a half ton of basic slag and a quarter of a ton of kainit should be used per acre. This method of fertilising is very suitable for heavy soils. On lighter soils bone meal may be substituted for the basic slag, but a smaller quantity should be used.

VARIETIES

There are a good many varieties obtainable, some being more suited for forcing than are others. The Streeter is an excellent kind for most methods of cultivation, as is also Victoria; Royal Albert is an excellent variety, being especially suitable for forcing, as is also Dawe's Champion. Other excellent kinds include Hobday's Giant and Myatt's Linnæus; while Scarlet Defiance, although an old variety, is a good second early.

CHAPTER XXIII. SEAKALE

§ SEAKALE

GENERAL CULTIVATION

ALTHOUGH seakale is not at present such a popular vegetable as asparagus, it is nevertheless increasing in the favour of the public. It possesses the big advantage of being easy to cultivate successfully; but although the growth of this crop is simple, failure will result if the necessary operations are neglected.

Seakale may be grown on almost any good quality loam, but the best results will be obtained on strong land of good quality. Farmyard or stable manure freely applied will also be of the greatest benefit to the crop.

Land to be planted with this crop should be deeply worked, having at the same time a really good dressing of manure worked in while digging or ploughing; digging, if the land is left sufficiently rough for the winter, gives the best results.

Planting may be carried out during the autumn, winter, or early spring. On heavy soils on which the best results are likely, March is the most suitable month for the work. On lighter soils the autumn is more suitable. The winter months should only be made use of for planting when the winter is a very open one, or when it has been impossible to get the work done under more favourable conditions. The soil should be levelled before planting is begun.

Plants may be planted varying distances apart with successful results. A good deal depends upon the quality and character of the soil on which this vegetable is grown.

Some growers are content to plant $1\frac{1}{2}$ feet apart each way; others make the rows $2\frac{1}{2}$ feet apart, putting the plants in at a distance of $1\frac{1}{2}$ or 2 feet apart, while others again allow the rows to stand 4 feet apart and the plants 2 feet 6 inches apart in the rows.

To obtain particularly fine plants on heavy soils, the last spacing is the most suitable. Excellent results can, however, be obtained by having the rows 2 feet 6 inches apart, and the

plants from 18 inches to 2 feet apart in the rows, and for general purposes these distances are recommended.

Seakale plantations may be made from seed, or from roots or "thongs." The last is the method usually adopted by market growers, as a quicker return is obtained.

Young plants may be dibbled in, or a trench about 1 foot deep may be opened to receive the plants. These should, when planted, be covered to a depth of from 1 to 2 inches with soil. When the plants grow, all flowering shoots should be cut away, or the plants will suffer.

It is very essential that the soil be regularly hoed between the plants. Apart from this, little further work should be necessary during the summer.

Blanching may, and often is, carried out by means of covering the heads with soil. Pots may also be used for the purpose. These should receive a light covering of any suitable material that may be available.

FORCING

Seakale is a very easy vegetable to force, but like most plants there is a right and a wrong way of carrying out the work. The most important point to remember is that of temperature. It is important that the plants be forced slowly, or the quality of the crop will suffer. It is always possible to recognise seakale which has been forced more quickly than is desirable by the fact that the sample is thin and poor.

Although the maximum temperature for forcing is 60 degrees, it is well to begin considerably lower than this. A temperature of 50 degrees will be ample for a beginning, and towards the end of the forcing period 55 to 57 degrees should be sufficient.

Another important point is that this crop must be forced in absolute darkness.

In one way these plants are very adaptable. It is not necessary to possess special sheds or buildings of any description for the purpose. Any kind of shed, pit, or frame will do if it can be made dark. The roots are packed as closely together as possible in leaf mould or old manure which has lost the greater part of its heat. The first batch of plants for forcing are usually carried to the forcing shed about the middle or the end of November; preparation consists of lifting the plants in the autumn. One year old roots are best for the purpose. They

should be watered, as soon as they are planted, with water which has been warmed sufficiently to get the air off, and covered to a depth of 3 or 4 inches with soil. It will take about a month or slightly longer for the crop to mature. Seven weeks is not too long if forcing has been steady. Cutting should take place when the heads are 6 or 7 inches high. Roots treated in this way are not worth keeping after the crop has been gathered. It is, however, possible to force seakale for several years in succession without this wastage of roots.

Out of door forcing is usually carried on with the aid of proper seakale pots, although ordinary pots or boxes with movable lids of the right size will answer well for the purpose. It is usual to plant in clumps for this purpose. Manure is spread round these covers, and litter is spread over them. Seakale of excellent quality may be obtained in this way.

Seakale may be forced on hot or on cold beds without any great difficulty. Forcing on cold beds consists of marking out beds of the desired size, leaving an alley half the width of the bed between. From this alley the earth is removed to a depth of about 1 foot on to the beds, and in these raised beds the roots are planted. Frames are placed over the plants, and the alley on either side of the bed is filled with manure, which should be well trampled. These frames are covered with mats or with some similar material which will keep out light. It is advisable to spread litter over beds, and it is also advisable to cover the mats with a light covering of straw or some similar material.

The method of forcing in hot beds is almost exactly similar, except that after the hot beds are prepared, these are covered with several inches of soil, in which the crowns are planted. It is necessary once more to repeat that the hot beds should be sufficiently cool before planting is attempted. It is very easy to force in too great heat.

There are many other methods of forcing, all of which, although different materials may be used, are similar in principle, and once it is understood that a limited amount of heat and complete darkness are the two essentials, the grower may be left to choose his own method of obtaining a crop.

HARVESTING

Seakale grown out of doors is usually ready for cutting during March, the harvesting period lasting for five or six weeks.

A flat, well-sharpened spade is used for the purpose. The shoots are cut with about $\frac{1}{2}$ inch of the roots attached. If the plants have been forced by means of pots or boxes, the tops of the boxes should be left open after cutting. Cutting finished, a part of the soil which has been taken from the beds should be returned, so that the stumps which are left in the ground are covered with soil to a depth of an inch or two.

EXHIBITION

Seakale is not largely grown for exhibition purposes. Should it be decided to exhibit, it will be necessary to select stout, even shoots which have been blanched to perfection. The shoots chosen should be 8 or 9 inches in length. Twelve shoots are usually shown neatly tied together in an upright position.

MANURES

Seakale can scarcely be too well fed, especially with farmyard or stable manure, which should be applied to the soil and worked in when preparations are being made for planting.

In addition, there are two or three fertilisers which may with advantage be applied to this crop, although on really suitable soil excellent results may be obtained without the aid of artificial manures.

Nitrate of soda will help forward growth considerably, once a start has been made. This should be applied at the rate of from $1\frac{1}{2}$ to $2\frac{1}{2}$ cwt. per acre.

Salt is of assistance to this crop, but it should be applied alone and not in addition to other fertilisers. A quarter of a ton per acre is a useful dressing. Guano is another useful manure for seakale. It is best applied during May, and should be used at the rate of from $1\frac{1}{2}$ to 2 cwt. per acre.

It is a useful plan to work in with the manure, when the soil is being prepared. kainit at the rate of from 3 to 4 cwt. per acre, while an application of superphosphate just before planting will also be found useful.

VARIETIES

There is little to choose between the different varieties. Lily White is perhaps the exception, so far as its value on the

market is concerned, as it is more attractive in appearance than most other kinds. The Purple-tipped seakale is not so good looking, but has rather a stronger constitution, which makes up for its lack in this direction. Ivory White is another variety which is well worthy of a trial.



CHAPTER XXIV. SHALLOT

§ SHALLOT

GENERAL CULTIVATION

THIS is a popular vegetable which, for all its popularity, is not very largely grown for sale. It may be grown year after year on the same soil without any falling off in the quality of the crop. It is very largely used in pickles, and for this purpose it may, should the demand be sufficient, be profitably cultivated.

It is not advisable to grow shallots from seed as they scarcely, if ever, come true. Bulbs should be planted, and this should be done as early as possible in the spring.

Preparation of the soil consists of deep digging during the autumn, getting it into a fine tilth before planting, and then making it thoroughly firm ; in fact, the preparation of the ground is very similar to that required on land which is to be planted with onions.

When the ground has been prepared, mark out rows about 1 foot apart, and plant the bulbs about 9 or 10 inches apart in the rows. Planting consists of simply pressing the bulbs in the soil. It is a mistake which is sometimes made to earth up the shallots ; this should on no account be done. It is far better to draw the earth away so that the bulbs are exposed.

After frost, it will be necessary to go round the plantation carefully, putting in place again any bulbs which the frost has lifted out of the ground.

Many gardeners have a habit of harvesting the crop on the longest day ; others, again, plant on the shortest day and lift on the longest day. There is no need to stick too closely to this rule, but it is a good guide as to when planting and harvesting may be carried out.

HARVESTING

When the shallots are ready they should be pulled up and laid out to dry. It is an advantage if they can be laid in trays for this purpose, so that should there come a spell of unfavourable

weather, they may be placed under shelter temporarily. They should be turned over from time to time.

Another method of ripening is to tie up the shallots in bunches and hang them up. Store in a cool, dry shed in such a manner that air has access to them. Grading consists in sorting out those of medium size for planting, small size for pickling, and the larger sized bulbs for general use.

Little, if any, loss is likely to result from shallots going bad. They possess very good keeping qualities and, if properly ripened and stored, little further attention should be needed. At the same time, it is as well to examine the crop from time to time, and should there be any which have failed to keep, these should be picked out. Before storing it is advisable to top and divide the bulbs.

EXHIBITION

For exhibition purposes the general cultivation of this crop is the same as for those grown for general purposes. Bulbs for planting should have the advantage of a sheltered position. They should be planted early in February, if weather conditions are favourable, on soil which has had worked in with it a thorough dressing of manure. The rows may be 1 foot apart, but the bulbs should be from 15 to 18 inches apart in the row. Applications from time to time of liquid manure will be found beneficial to this crop, as will also an application of half-decayed manure when the plants are growing strongly.

MANURES

Farmyard and stable manure have already been dealt with so far as this crop is concerned. Their value is too important to be neglected.

Nitrate of soda is useful, applied in comparatively small quantities after the bulbs have begun to make growth. Superphosphate and kainit may be usefully applied to the soil when preparations for planting are going forward.

On soils which are suitable for this crop, good quality shallots may be grown without the aid of these fertilisers, but on soils of most descriptions better results will usually be obtained if the plants are assisted by moderate dressings of those manures mentioned.

VARIETIES

There are two types of shallots in favour—the Cluster varieties and the Russian kinds, with which the Jersey and the Dutch kinds are closely connected. Shallots of the Russian type are not so suitable for pickling as are shallots of the Cluster type, neither have they such good keeping qualities.

The Chester is one of the best varieties which can be grown for pickling, while for ordinary use the Giant should not be neglected.

PESTS AND DISEASES

The shallot suffers from the same insect enemies and diseases as does the onion, and particulars of these and their treatment may be found under this head.

CHAPTER XXV. SPINACH

§ SPINACH

GENERAL CULTIVATION

Too big an area of ground should not be given to the cultivation of this crop for market. It has a steady sale, so that it is necessary to devote some land to its cultivation, especially where a direct business is done. Spinach may be successfully grown without any great amount of trouble, and it is often employed as a catch crop, as it matures very quickly. Although it may grow well on almost any kind of soil if this is deeply worked, it does best on a good quality loam. Manure is a necessity for this crop.

§ SUMMER SPINACH

It is necessary to choose a sheltered position for this class of spinach. Sowings should be made at intervals of about twelve or fourteen days, beginning in January and continuing until May. Drills should be about 1 foot apart and about 1 inch deep. Thinning should take place when the young plants are nicely through the ground, the most vigorous plants being left from 6 to 9 inches apart. Later it may be necessary to thin again should the plants become crowded. It is the practice among some growers to allow the plants to become crowded, but this is a big mistake.

It may be necessary to water plants from later sowings, but apart from this their treatment will be the same as for plants from seed sown early in the year.

§ WINTER OR PRICKLY SPINACH

This is also usually grown from seed sown at intervals. The first sowings are usually made early in July and continued until August, September, or October, according to the climatic conditions.

Seed of this class of spinach should be sown much more thinly than is the seed of summer spinach, for the reason that three or four plants may spring from what appears to be a single seed, but is actually a cluster of seeds.

Drills should be 1 foot or 15 inches apart, and the seedlings should first of all be thinned to 3 or 4 inches apart, and later to 6 or 9 inches.

§ PERPETUAL SPINACH OR SPINACH BEET

This plant is grown in a very similar manner to ordinary beet, only it is valued for its leaves instead of its root growth, and for this reason it is more important to encourage good leaf growth than it is the production of roots of large size.

It will do well on a rich loam, which should be deeply worked, but not of necessity as deeply as where ordinary beet is concerned. It is no detriment, but rather an advantage to this crop, if the soil is heavily manured the same season, as the roots are quite worthless. Sowing should take place from the end of March or early in April, until the end of July or early in August. Drills should be about 1 foot or 15 inches apart, and the plants thinned to 7 or 8 inches apart. Leaves should be gathered as soon as they are ready.

§ NEW ZEALAND SPINACH

During seasons in which ordinary spinach will not flourish, and on soils where it cannot be grown to perfection, particularly soils which are hot and dry, in hot, dry seasons New Zealand spinach may be grown almost to perfection. It is an excellent substitute for spinach, and while it is not at present very largely grown, it deserves greater popularity than it has up to the present obtained.

New Zealand spinach will not stand frost, so that should it be desired to sow seeds early it will be necessary to give them the protection of glass. Towards the end of March will be a suitable time for these sowings, and the seedlings should be pricked out into other boxes as soon as they are large enough. The distance of the plants apart each way when pricked out in this manner should be about 4 or 5 inches. After hardening

off, the plants should, towards the end of May, be planted 1 foot apart in rows about 2 feet apart.

Open-air sowings should not begin until the end of April or towards the beginning of May, when drills about 2 feet apart should be drawn out. When the plants are up they should be thinned to about 1 foot apart in the row.

This crop does not succeed well on heavy land, but heavy soil may often be improved sufficiently to grow good crops by the addition of ashes, road sand, or similar material.

MANURES

Good quality spinach depends to a great extent upon obtaining quick growth. Heavy manuring by means of farm-yard and stable manure at the time of preparing the soil will do a good deal towards this, as will also the occasional application of liquid manure.

There is no fertiliser which encourages quick growth to the same extent as does nitrate of soda, and one or two applications of this will be found very beneficial.

If two applications are made, the first, at the rate of 1 cwt. per acre, should be given just after thinning the plants, and the second may be given a fortnight or three weeks later.

VARIETIES

Victoria is generally recommended as one of the best of the summer varieties to grow, and it is a favourite with growers for market. There are, however, other varieties which run this very close, among which may be mentioned the Lettuce-leaved and Long-standing Round.

For winter use the Lettuce-leaved may be grown, if desired, as it will stand through the winter as well as any of the so-called winter varieties. Flanders is another variety suitable for either summer or winter use. Large Prickly is the most widely cultivated for winter use, while for spring sowing the Carter is an excellent variety.

PESTS AND DISEASES

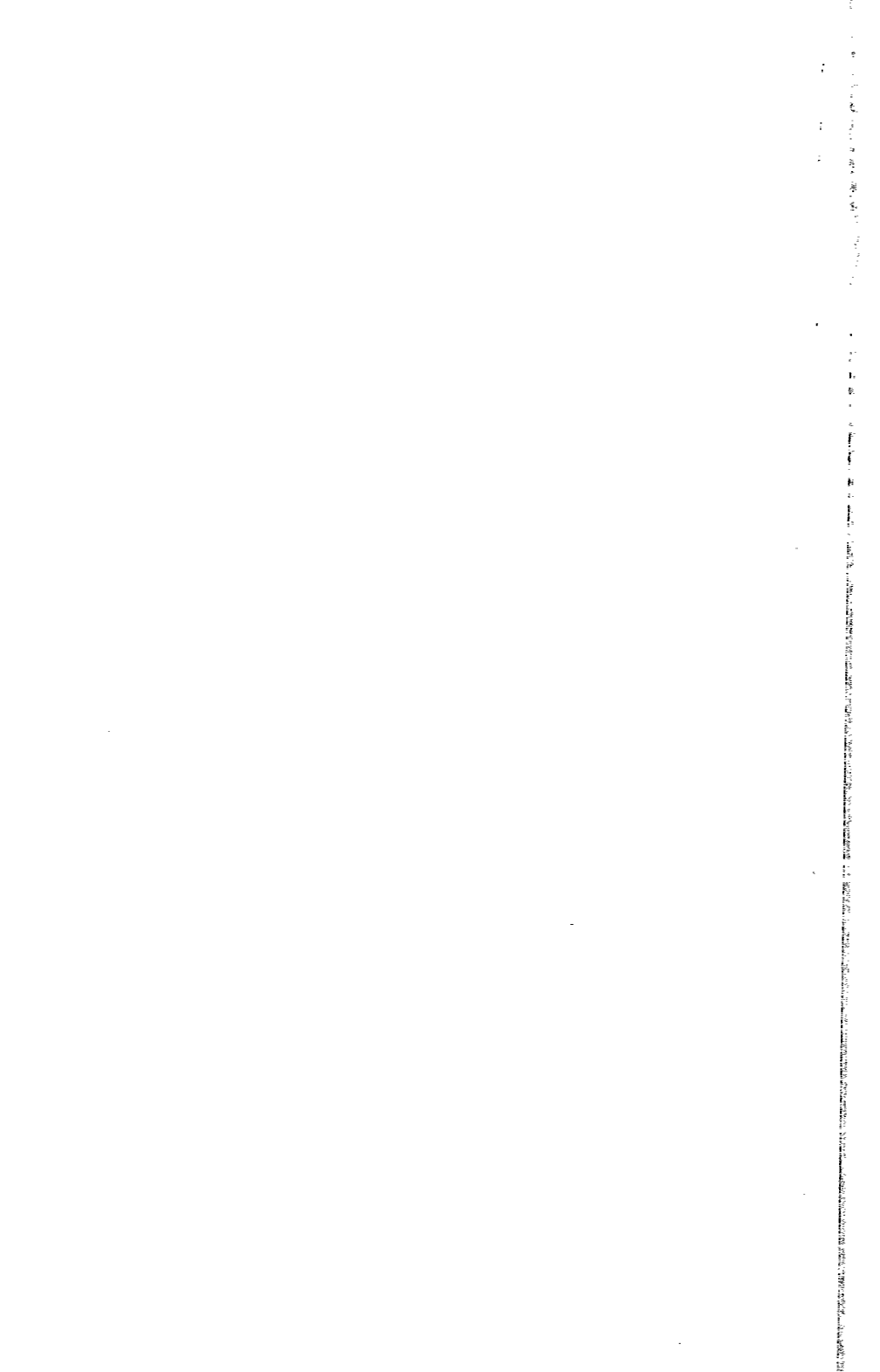
Spinach mould is a disease which at times attacks the undersides of leaves of the plants. Patches of a grey-coloured mould form, which spread very rapidly, and in bad cases may destroy the crop.

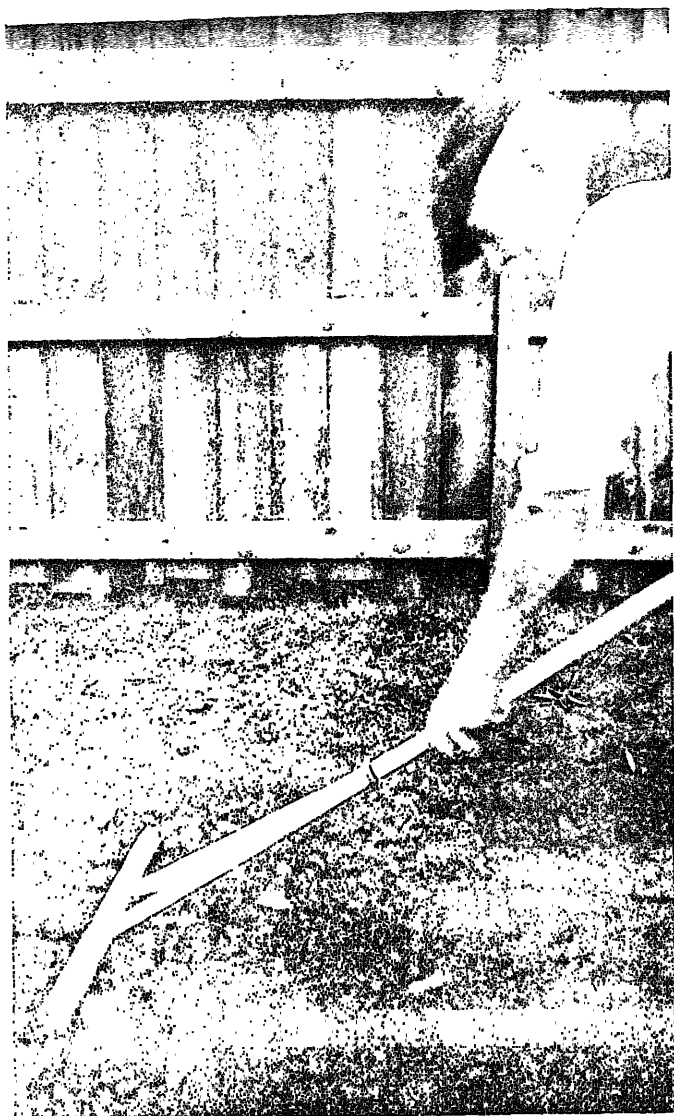
The best remedy is to collect and destroy all leaves as soon as they become affected, as by this means the disease is prevented from spreading.

The caterpillars of the buff ermine moth feed upon the leaves of spinach as well as of other plants. The damage which these caterpillars do is serious, as they eat the edges of the leaves and also eat holes in them. The caterpillars are about $1\frac{1}{2}$ inches long, with tufts of yellowish hairs and an orange stripe down the back. Eggs are laid in August or September, and the caterpillars hatch out a short time afterwards.

This pest has quite a number of natural enemies, among which are included two or three members of the tit family, the rook, the starling, and the water wagtail.

Spinach is not grown on such a large scale that hand picking would be a lengthy operation, and should there be any signs of damage by this pest, hand picking should be carried out.





Marking out Drills on a Seed Bed for sowing small Seeds.

CHAPTER XXVI. TURNIPS

§ TURNIPS

GENERAL CULTIVATION

THE turnip is one of the easiest vegetables to grow successfully, especially when soil conditions are favourable. The favourite soil of this crop is a rather light, sandy loam; but it may be grown on land of almost any kind with careful preparation, although results will not be as good as on land on which soil conditions are to its liking.

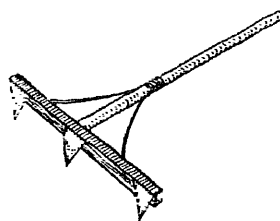
To grow turnips for profit it is necessary to begin at the earliest possible moment and to continue right through the season.

Whatever soil is available, lime should be present in fair quantity for this crop, so that a dressing of this material from time to time will prove of the greatest benefit for most crops.

General cultivation consists in selecting a sheltered position for the first sowings out of doors. Some time during March, as soon as weather conditions are suitable, the soil should be broken until the surface consists of a fine tilth. Turnips will not succeed in lumpy soil. Sowings are often made broadcast, but sowing in drills is to be preferred in every way.

Drills should be about 1 foot apart, and from 1 to $\frac{1}{2}$ inches deep. Where soil conditions are not quite all that they should be, drills may be drawn the same distance apart, but from 3 to 4 inches across, and the same depth. These should be almost filled with manure or wood ashes, and covered with fine soil until the surface is level with the surrounding surface of the bed.

In either case the seed should be thinly sown, a light covering of soil should be drawn over it, and the back of a spade should



Marker for marking out three drills at a time (*see* photograph).

be used to make the bed firm. It is also important that the soil should be moist.

Another important point for success with this crop is thinning. The first thinning should take place as soon as the plants are big enough to handle. The first thinning consists of reducing all groups to a single plant, and these should then be thinned to a distance of from 4 to 5 inches apart. At this distance the plants may be allowed to grow until they are sufficiently large to supply tender, sweet young turnips for the table or for market, when every other one should be drawn, leaving the remainder of the crop from 9 to 10 inches apart.

In a very dry summer it may be necessary to water turnips, especially on the class of soil which suits them best—a sandy loam. When it is necessary to water this crop, a thorough soaking should be given.

If the crop is grown on a large scale it will be impossible to do this, and the plants will have to take their chance in a dry season, apart from what can be done by regular hoeing and other methods of conserving any moisture already in the soil.

Further sowings should be made at intervals until May.

EARLY CROPS

As early as January the first sowings may be made; but assistance must in most cases be given if these are to mature into good quality vegetables.

It is usual to make a slight hot bed of manure or leaves on the surface of the soil about 18 inches thick, and to cover this with 3 or 4 inches or more of fine soil. Seed is usually thinly broadcast over the bed, though it may be sown in drills if desired. Over the bed frames are then placed, keeping the lights closed at first, but after the first thinning giving slight ventilation, and gradually increasing this as weather conditions permit until air is freely admitted.

As soon as the young plants are big enough to be handled they should be thinned to stand about 4 inches apart each way. It will be necessary to water regularly plants grown in this way.

Another method of obtaining early crops of turnips is to dig out the soil to an even depth of 6 or 7 inches. Fill up the hollow so formed with manure or leaves so that the hot bed so formed stands about 6 inches above the level of the ground after being well trodden down. The soil which was removed at first is then

broken up finely and spread over the hot bed, after which seed is sown in drills 5 or 6 inches apart.

Protection may take the form of litter spread over the bed, or of mats laid over hoops spanning the bed or supported in some other way.

No air is admitted until the first leaves show, after which the amount admitted is gradually increased until the mats are left off altogether.

Thinning and watering is the same as for crops grown in frames.

HARVESTING AND STORING

It is usual to gather turnips as they are wanted; this is especially the case with early crops. It is sometimes necessary to store a part of the main crop for a time. After lifting, the tops should be cut off and the crop stored in a clamp made in exactly the same way as a potato clamp is made, or they may be stored in a cool, dry shed in sand or light loam. This last method is the best where no great quantity of turnips are grown. A part of the last crop of turnips sown may be left in the ground to provide greens for the spring, or, more usually, a special sowing is made in September for this purpose, the seed being sown broadcast and left unthinned.

LATE CROPS

Sowings for late crops are made in small batches from the last week in July until the last week in September. Weather conditions play an important part in the success or failure of these late sowings.

EXHIBITION

Turnips suitable for exhibition may be produced by the manner already described. During hot weather beds from which plants are to be taken for this purpose should be shaded. It will also help the plants considerably if a quantity of wood ashes is mixed with the soil when preparations are being made for sowing.

Medium-sized turnips should be selected for exhibition, and the tap roots should be small. Skins should be clear and undamaged, and they should be washed with a sponge before being shown. Six turnips are the usual number required.

MANURES

Soil for turnips should receive a good dressing of farmyard or stable manure either when preparing the ground or for a previous crop. In addition, wood ashes are particularly useful where this crop is concerned, and if any are available, advantage should be taken of this. Lime is a necessity where this crop is concerned, and if there is any doubt at all as to its presence, a dressing of this should be given at intervals. An easy way to test soil for the presence of lime is to take small samples of soil from different parts of the plot to be devoted to the crop and mix them together, placing a part of the mixed soil in a glass. A wineglassful of muriatic acid is then poured over the soil in the glass. If the mixture fizzes well it may be taken for granted that the soil contains enough lime for the crop; but should the mixture effervesce only a little, or not at all, a dressing of lime should be applied at the first opportunity. Turnips cannot be grown successfully in soil which lacks lime.

For sandy loams bone meal is one of the best fertilisers for turnips. Basic slag is also useful, but it is more suitable for heavy soils, on which it should be used at the rate of about half a stone per square rod. Superphosphate is useful on chalky soils, and 4 lbs. of this should be used for the same area. As soon as the seed is in the ground a dressing of soot will prove useful, as it will help the seedlings to get into rapid growth.

VARIETIES

There is a plentiful choice of varieties from which a selection may be made. Many of these are equally useful: Early White, Milan, and Early Red Milan are two excellent kinds, being specially suitable for early cultivation in frames; Early Long Forcing and Early White Strap-leaf are other good varieties suitable for the same purpose.

Golden Ball, White Gem, Snowball, and Red Globe are useful varieties for general purposes, while for winter cultivation Prizetaker is one of the best.

PESTS AND DISEASES

The turnip suffers from more than its fair share of diseases and pests, and, in addition, some of these pests which attack this crop are particularly harmful.

The turnip flea beetle will often ruin an entire crop of turnips. It is a dark-coloured beetle with two white stripes down its back. In size it is only about $\frac{1}{8}$ inch long. Damage done to the young plants as soon as they appear above ground.

In quick-growing seasons damage by this beetle is less serious than when weather and soil conditions are such that slow growth is made. As soon as the turnips have formed their young leaves they are safe from damage by this beetle. Every effort should therefore be made to encourage the turnip to make as vigorous growth as possible at the start. For this purpose, in addition to the manures recommended, the application of soot as suggested is particularly useful. The plants will also benefit from a dusting with lime or soot, or both, while the worm is on them.

The larvæ of the turnip sawfly do at times considerable damage to this crop. Eggs are laid in a slit in the undersides of leaves. Although one egg is laid in a slit, one sawfly will lay out two hundred and fifty eggs in a single season.

The black larvæ are sometimes called "niggers." They must not be confused with the larvæ of the ladybird, which is also known as "niggers," although there is little, if any, resemblance between the two, except that both are dark in colour.

When a bad attack is made upon the plants, the leaves are almost entirely eaten away.

A soil fumigant will do a good deal towards lessening the trouble likely to result from this pest, as will also spraying with a mixture of soft soap and quassia; while brushing the leaves of the plants with twiggie boughs is an immediate remedy, as soon as the caterpillar is brushed off of the plant it never gets back to it again.

The turnip diamond moth is probably the most injurious of the moths which attack this crop. Eggs are laid in the spring on the undersides of the leaves. It is during the caterpillar stage that damage is done to the crop. These feed upon the foliage.

Dusting the plants with a mixture of lime and soot when an attack is noticed will do a good deal towards lessening the injury caused by this pest.

The turnip leaf miner bores tunnels in the tissues of the

leaves of turnips. Leaves which are attacked should be burnt.

Turnip aphis is one of the numerous families of green fly. It damages the plants by sucking sap from the leaves. Plants which are attacked should be sprayed with paraffin and soft soap.

The turnip gall weevil acts in exactly the same way as the cabbage gall weevil, and similar steps should be taken to eradicate this pest.

1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".



Pinching out the Ends of Leaders of Vegetable Marrows to prevent them spreading too far afield
and to cause them to branch.

[*To face p. 161.*]

CHAPTER XXVII. VEGETABLE MARROW

§ VEGETABLE MARROW

GENERAL CULTIVATION

THE vegetable marrow is grown in almost every private and market garden. The large marrows which at one time were the aim of every grower to produce, have largely gone out of fashion, and growers now aim at the production of marrows of medium size and of good quality and shape.

For market purposes also it should be the aim of the grower to obtain early supplies, for later in the season this vegetable becomes plentiful.

Marrows like an abundant supply of manure. It is difficult, or rather almost impossible, to supply this too freely. Shade should also be avoided. Marrows cannot be grown to perfection unless they get their fair share of sunshine. Apart from these conditions, most classes of soil will grow this vegetable successfully.

It is grown both as a field crop and a garden crop. Grown on a large scale, the most suitable method is to take out trenches which may vary in width according to the type of soil. On very light soils the trenches may be as much as 4 feet in width: on heavier soils 1 foot will be sufficiently wide for the purpose. About 10 inches on the heavier soil and 2 feet on the lighter classes of land should be a suitable depth for these trenches. Manure is then put in the trenches, trodden down, and a further quantity put in until the manure is at least 1 foot in thickness. On the top of this is placed the soil which was taken out when making the trenches.

This work should be done about the middle of May, and about a week later than this the seed may be sown. At intervals of 3 feet, plant three seeds in triangular form 2 or 3 inches apart. The seeds should be covered with soil to a depth of about 1 inch. Over each of the batches place a good big flower pot. These should not be moved until the plants begin to grow, when they should be moved first of all during the day. After

about ten days the pots may be removed altogether. Only the strongest plant should be left in each position, the others being removed as soon as the young plants are well up. Thinning should not be carried out too early, as it will be found that many of the plants will be lost.

If it is not desired to plant seeds in the positions in which they are to remain, plants may be raised for planting out, or they may be bought for the purpose.

Vegetable marrows do not like root disturbance, and this is one point in favour of sowing the seed where the plants are to remain. On the whole, however, better results are usually obtained where plants are raised and transplanted to the positions they are to occupy.

One or two seeds should be planted in 3-inch pots filled with a good loam and leaf mould. The pots should, after planting, be placed in gentle heat in a frame, on a hot bed, or in a greenhouse. This should be done in April.

Planting out may take place during the last week in May or the first week in June ; but before doing this the plants should be hardened. This may be done as soon as two rough leaves are formed, admitting air gradually at first and then gradually increasing it.

The plants should be planted in the middle of the trench a distance of 3 feet apart. They should, before being moved, be well watered. After planting, they should be protected for a time by hand glasses or by pots, after which the pots or glass should be taken away.

During a dry summer it will be necessary to water the plants from time to time, as marrows will not thrive without sufficient moisture. Apart from this, and keeping the soil free from weeds, little further attention will be necessary. As for pinching out, it is purely a matter of opinion whether or not this is advisable. If plenty of space is allowed for the plants to extend, no pinching will be necessary ; on the other hand, where space is limited it may be advisable to pinch the end out when they have extended to about $1\frac{1}{2}$ or 2 feet. This will encourage them to branch.

EARLY CROPS

The cultivation of marrows in frames is of the greatest importance, as it is the early marrows which are in such keen demand.

A hot bed of leaves and stable manure should be made, and in this the soil should be placed to a depth of about 9 inches. Time should be allowed for this to cool, when the plants may be put out.

The plants should be raised in pots in the manner already described. It is important to keep a suitable temperature, although a fairly wide margin may be allowed for this vegetable.

If about 65 degrees can be maintained, with a rise to 75 degrees, or slightly more in sunshine, it will be very suitable for the plants.

The temperature should not fall below 55 degrees or above 80 degrees if success is to be obtained.

Air should be freely admitted when weather conditions are suitable; while should there come exceptionally cold spells, extra assistance should be given to keep the temperature above the minimum.

It will be necessary to water the plants freely, and they will benefit if liquid manure is used at intervals. When the weather becomes warm enough the frames may be taken away altogether.

HARVESTING AND STORING

Marrows should not be allowed to attain to full size, as this means a considerable reduction in the cropping capacity. If the marrows are cut as soon as they reach about half full size, they will not only be appreciated to a greater extent, as the quality will be superior, but the plants will produce at least four times as many marrows as when cutting at the proper time is neglected. Fruit to be used for jam should, however, be allowed to ripen, although they should be cut before there is any danger of frost.

Marrows will keep for some time if gathered dry and stored on a shelf in a cool, dry shed. The air must circulate freely around them.

EXHIBITION

No particular methods of cultivation are necessary for marrows intended for exhibition. Care should be taken in the selection of suitable marrows for this purpose; but these should not be overlarge, as very large marrows stand but little chance of winning a prize in shows of any standing to-day.

MANURES

Marrows need to be fed plentifully with natural manures. Such feeding is guaranteed in the formation of the beds on which the plants are grown. It is also illustrated by the fact that in a great many private gardens marrows are grown on flat-topped heaps consisting partly of manure and partly of rotted garden rubbish. The manure supplies not only heat, which is essential, but also a part of the food of the plants.

Watering with liquid manure is also beneficial to these plants. Frequent waterings with liquid manure are not necessary, but occasional applications will do a great deal of good.

Nitrate of soda, kainit, and guano are useful fertilisers, and manures for marrows, either separately or mixed, as are also dried blood and superphosphate.

Excellent marrows may be grown where fertilisers are judiciously used in conjunction with farmyard and liquid manure, but very good results can be obtained where only the last two are available.

VARIETIES

Four classes of vegetable marrow are cultivated. They are the Green marrow and the White marrow, the Trailing and the Bush marrow. Trailing marrows include both green and white marrows, as do also bush marrows.

The bush marrow has a great deal to recommend it, as it is compact in growth. Pen-y-Byd is another excellent variety of the same colour. Long Green and Long White are other useful kinds, as is also Tender and True.

PESTS AND DISEASES

Fruit rot is a disease which attacks not only marrows but also cucumbers and melons. This disease attacks not only the fruit, but also the leaves and stems. Plants attacked are quickly rendered useless. Unfortunately, there is no remedy for this disease, which is to a great extent caused by the plants being grown in a low temperature.

If grown within the limits of temperature already given and

watered with slightly warm water, there is very little danger of this disease doing serious injury.

This is the disease most likely to do serious damage; although the vegetable is at times attacked by other pests and diseases, it is not often that these are responsible for serious damage to the crop.

CHAPTER XXVIII. ROTATION OF CROPS

THE successful cultivation of vegetables consists of something more than a knowledge of how to grow each kind that is wanted. There is the matter of the arrangement of the crops to consider, and this will influence very largely the amount of success likely to follow a year's work in the garden.

With one or two exceptions, it is important that the same crop should not occupy the same piece of land for two years in succession.

There are two big reasons why rotation of cropping is important. The first is that certain diseases or pests will remain in the soil during the winter, and should the ground be again cropped by the same kind of vegetable attacked the previous season, the attack the following year will be much more severe. If, on the other hand, the soil is occupied by a vegetable not subject to attack by the particular pest or disease, these will either be starved out or will move to other quarters, so that they are to some extent kept in check by the constant changing of the ground occupied by any particular crop.

A still more important reason is that different kinds of plants need from the soil different foods. The soil may contain these foods in sufficient quantities to produce an excellent crop the first year; but if the experiment is repeated the following year, sufficient food may not be there to produce a heavy crop, or the quality of the produce may suffer through lack of certain foods.

It is true that by the careful use of fertilisers this difficulty may be overcome to some extent, but it may be entirely overcome by changing the position of each crop over a number of years.

To do this and to have the right amount of soil available to allow to each crop its proper share of ground will need careful thought. It will have to be done systematically to give good results.

A part of the garden will in any case have to be given over to permanent crops, of which asparagus and rhubarb are two

examples ; the remainder may be divided into three or four or more parts, as decided when arranging the rotation.

A three years' rotation could be arranged somewhat after the following manner : The first plot could the first year be devoted to Brussels sprouts, broccoli, and similar vegetables ; the second plot could be given over to peas, onions, beans, with turnips to follow ; and the third plot might have on it mostly root crops, with potatoes and celery.

The two following years the cropping would be changed so that in the second year number two plot grew the same vegetables as were grown on number one plot the first year, and number three plot the same vegetables as were grown on plot number two. Number one plot would grow the vegetables grown on number three plot.

The third year number three plot would grow the vegetables grown on number one plot the first year ; number two plot would grow the vegetables which were grown on number three plot the first year ; while number one plot would grow the vegetables which were grown on number two plot during that season.

The fourth year's cropping would be the same as the first year. This system of cropping would be repeated, coming back to the same cropping arrangement for each plant every fourth year.

For a four year rotation the land would need to be divided into five parts. One part would, as before, be devoted to permanent crops.

During the first year potatoes could be grown on the first part ; cabbages, cauliflowers, savoy, etc., could occupy part of number two ; leeks, onions, celery, and turnips would find space on number three plot ; while carrots, beetroot, parsnips, peas, and beans would be grown on plot number four.

Every year for four years the cropping on the different plots would be moved until the cropping the fifth year would be exactly the same as the first year.

It will be seen that the object which has to be remembered is that groups of vegetables which feed in a similar way, and which need the same kind of food, occupy the same plot.

It is not only the matter of the same kind of food to be dealt with, but that of the depth at which plants feed. The roots of carrots, parsnips, and beet go much more deeply into the soil

than do the roots of many other vegetables. They therefore take a good proportion of the necessary plant food from the soil at a depth at which it is untouched by certain other vegetables. It is good planning to keep the deep-feeding plants together and the shallow-feeding plants together as far as possible.

The kind of soil will influence the method of rotation adopted, because it will not be possible on some soils to grow certain vegetables, and others will have to take the place of these in the rotation.

The demand for any particular vegetable will also influence the arrangement of the rotation. If the demand for a particular vegetable is very keen in a certain district, a place will have to be found for the cultivation of this on a rather large scale, perhaps at the expense of some less popular vegetable. It may even be advisable to alter a four year rotation into a three year rotation so that larger space may be devoted to the culture of the particular crop.

In any case, it is a foregone conclusion that the better the arrangement of the cropping, the more successful will be the result.

CHAPTER XXIX. MARKETING

SELLING to the best advantage is as important as the production of vegetables to sell. I have written earlier in this work that a slight increase in the return for each vegetable or each package of vegetables marketed may make the difference between a reasonable profit and a loss. It is the grower's business to make the most of his goods. In order to do this he must not only harvest his crop at the time when it is in the best possible condition, neither too old nor too young, but he must grade and pack the vegetables in the best possible manner. There is, for instance, a big difference in appearance of an unwashed bundle of asparagus, the ends of which have not been cut so that they are of even length, and a bundle which has been washed and had the ends cut to an even length.

This is perhaps an exaggerated example, as to-day it is probable that few even of the most inexperienced growers would market this vegetable without washing and cutting; but every vegetable needs a certain amount of attention before being placed on the market.

In addition to the importance of gathering the produce at the right time, and the value of appearance, it is also important that steady supplies be maintained. The grower should so crop his land that he is able to keep his particular market supplied over as long a period as possible. No matter whether he supplies the wholesale or the retail market, or does a direct trade, he will find the demand for his produce considerably increased once it is known that there will be a long period of supplies with no long intervals between them. It goes without saying that vegetables for which there is little or no demand in any particular district should not be given land room.

If the wholesale market is supplied, a great many of the difficulties connected with marketing will be overcome, for the salesman will usually supply the grower with the right type of empty for any vegetable to be marketed.

It should be remembered, however, that such empties are the property of the salesman concerned, and to fill them with

produce and consign them to another market where one has heard that better prices prevail is not permissible, unless permission has first been obtained from the owner, and then the grower will be held responsible for their safe return.

For this reason many market gardeners purchase a number of empties suitable for the more important vegetables, so that should there be a fall in prices in the market to which they usually send their goods, they can immediately turn their attention to other markets where better prices may be gained.

There is another difficulty which the grower who does not confine himself to one market may have to overcome. Different methods of packing are favoured in different parts of the country, and while a certain type of package might meet with favour in London, an entirely different method might be favoured in the North. This does not apply to every class of vegetable; but there are a good many to which it does apply, and the grower who conforms to the customs by sending his produce to market in the type of package favoured, will usually obtain better results for his returns than will the grower who ignores custom in this respect and markets his produce in one type of package for all districts.

The market gardener who supplies the retail trade is in a somewhat different position. The type of package is not of such importance so long as the produce is well graded, is at the right stage of maturity, and is so packed that it will arrive at its destination in good condition. This applies also to the market gardener who does business direct with the public.

The following methods of packing are those not usually employed. It does not follow that there are not exceptions, for, as previously stated, methods vary in different districts.

GLOBE ARTICHOKE

These are carefully packed in baskets, usually in layers. The heads are cut with a short piece of stem attached just before the scales open.

JERUSALEM ARTICHOKE

These are packed in half-bushel baskets and covered with hay or straw kept in place by cross sticks. Grading is necessary for this vegetable, all small tubers being thrown out.

ASPARAGUS

This is one of the vegetables which is marketed in different types of bundles in different parts of the country. In one district a bundle of sixty or one hundred and twenty is favoured; in another, bundles of one hundred are preferred. In some cases the large bundle is composed of six small bundles; in other districts this is not the case.

No matter to which part of the country this vegetable is sent, however, grading is particularly important. All thin sticks are bundled separately, and marked as "sprue." In some districts there is a very good trade for "sprue."

Asparagus quickly deteriorates if not marketed as quickly as possible after cutting. Packing into bundles is work needing experience, but special cradles are available which make the work of the packer much more simple.

The bundles are packed carefully into hampers, crates, or baskets, so that they may receive no damage in transit.

BROAD BEANS

These are usually marketed in bushel baskets. It is important that these are not allowed to get old before being gathered. The grower is advised to go over them sufficiently often to remove all risk of this.

DWARF BEANS

Dwarf beans are mostly packed in baskets which hold about a peck. They will show up to much greater advantage if blue paper is used as a lining. Grass is sometimes used as a covering. These also should be gathered sufficiently early, and often, to eliminate all risk of the pods getting too old, and also to ensure continuous cropping.

RUNNER BEANS

These beans are packed, as a rule, in larger baskets which hold a bushel or a half-bushel, and are covered with grass or hay.

GARDEN BEET

This is packed in any manner which will ensure the roots reaching the market without damage. Usually hampers or large baskets are used for the purpose.

SUGAR BEET

is not packed at all in the ordinary sense, but loaded on to carts, lorries, or trucks, and sent direct to the factory.

BROCCOLI

Cabbages such as these are usually packed in crates. It is important that these be carefully graded.

BRUSSELS SPROUTS

like asparagus, are marketed in several ways. Either bags or baskets of different sizes are used, according to the custom of the marketing district to which they are to be sent. These, like broccoli, need to be carefully graded if the best prices are to be obtained.

CABBAGES

also are marketed in a good many different types of packages. Nets are often used for the purpose, as are also crates and hampers, while in districts near to the markets no packages are used, the cabbages being loaded direct on to the lorries or wagons or railway trucks.

CARROTS

may be marketed in bags, baskets, or hampers, the first of these being used for the main crop. Early carrots are usually packed in hampers after being washed and tied into bundles.

CAULIFLOWERS

are packed in crates or in pads. They should be carefully graded and, after cutting, a few of the outer leaves are entirely removed, and those nearer the heart are cut so as to show the vegetable to the best advantage. Cauliflowers should be cut while the heads are nicely compact, and not left too long in the ground until they begin to lose their compactness.

CELERY

is marketed in bundles usually containing a dozen heads. The plants should, however, be at first carefully trimmed so that all loose leaves and stems are removed and then washed.

LEeks

are first bunched, then the tops of the leaves are cut off. The bunches are then washed and packed in crates. The number of leeks in each bunch varies to some extent, but usually consists of seven or eight.

LETTUCES

are usually packed in crates, the roots being removed, and if they are at all damaged a few of the outer leaves are also taken off. It is a good plan to grade lettuces into at least two qualities.

MUSHROOMS

are carefully packed, stalks downwards, in baskets lined with paper. Usually two grades of different sizes are made, with a third grade for any mushrooms which are damaged.

MUSTARD AND CRESS

is marketed in punnets.

ONIONS

may be marketed in hampers or in bags. The latter is the more usual method for dealing with autumn-sown kinds, while those kinds sown in the spring are usually marketed in hampers. These are bunched before being packed, the size of the bunches varying to some extent in different districts.

PARSNIPS

are marketed in several different ways. The roots should be washed before being put into bags or baskets, or whatever method of packing is adopted. All small roots should be picked out and sent separately.

PEAS

should be marketed just at the right stage of ripeness. It is a mistake too often made to pull before the pods are filled, and it is just as serious to leave the pods hanging until they are past the stage of fitness, at which they are tender and sweet.

Usually peas are marketed in bags, but early pickings are sometimes sent to market in baskets.

POTATOES

are usually marketed in hundredweight bags. This does not apply to all parts of the country, however, as eighteen stone

is the recognised weight in the North. This is known as a "load"; half-loads are also sometimes employed. Early potatoes are more usually sent to market in some kind of barrel or hamper, the type of package varying very considerably.

Before marketing, all diseased potatoes or "blights" are taken out, and usually the potatoes are sold on a certain riddle—a $1\frac{3}{4}$, $1\frac{5}{8}$, $1\frac{1}{2}$, being some of the sizes used. All tubers below the size at which the crop is sold fall below the riddle. Seed potatoes are rather smaller than this, but not too small. There is a good demand for seed off certain soils, and often very good prices are realised for seed off land specially suited to raising potatoes for this purpose.

RADISHES

are tied up in bunches and sent to market in any convenient package.

RHUBARB

is tied into bunches, which vary in size according to the season. Early rhubarb is arranged in bunches of very few sticks—two, three, or four being usual numbers; later eight, ten, or twelve sticks are usually put together in each bundle. Before the leaves are open, however, they are left on the young sticks; after they are open it is usual to cut the leaves off before tying into bundles.

SEAKALE

is usually marketed in punnets. The bundles will need washing before being packed into punnets. These are then placed in some suitable receptacle.

TURNIPS

are marketed in bags or baskets, as convenient. The earlier varieties are usually bunched before being packed, but the later kinds have the tops and roots removed only. It is always advisable to wash turnips before marketing them.

VEGETABLE MARROWS

are marketed in several different ways. Suitably made crates are sometimes used for the purpose, or they are simply packed as gathered into the conveyance in which they are to be carried to the market.

CHAPTER XXX. THE FINANCIAL SIDE

ANY attempt to give a definite statement of profit and loss from a garden of any particular size must fail. There are so many factors which influence expenses and income that these will vary considerably.

It would perhaps be as well here to name one or two of the factors which have an effect upon outlay and income. One of the most important is the difference in the quality of the soil in different districts. This will naturally make a difference to the cost per acre if purchased, or the rent if the garden is hired. The value of land also differs considerably with its position. Land near a large town is likely—other things being equal—to have a higher value than is land in the open country. Against this must be set the fact that if near a large town the market grower has a market already to hand, while the grower in the country may have to transport his produce a considerable distance by road or rail.

The value of land varies also from year to year. Land which one season will sell readily at £60 per acre, will another year make only about half this amount.

These are but one or two matters which will play a part in the financial side of market gardening. Perhaps it would be as well to go into the matter a little more in detail.

It may be estimated that the value of land per acre in the country lies, roughly, between £20 and £65, or £70, according to the quality of the soil and situation. Land near a town will be proportionately higher.

The rent of land which was worth these amounts would vary somewhere between £1 and £4. 10s. per acre, although where large areas are divided into comparatively small plots a much higher percentage than this is sometimes charged.

The cost of tools will not be great, but will depend to some extent upon the type of tool employed. If ploughs, harrows, and scrufflers are included, the cost will be greater than where the work is to be done by hand.

Naturally a man will need, in addition to sufficient capital to

work the land for a year, enough money at his disposal to keep himself and family for the same length of time. Even then the amount of capital needed is small: smaller, in fact, than for any other branch of business connected with the land. With from £30 to £50 to lay out, a man may make a start in a small way. With from £100 to £200, in addition to his living expenses, he may begin in a larger way of business. He will not have to wait so long for some return for his outlay as does the fruit grower; and should one crop fail he will have many others with which to recompense himself to some extent.

Should it be necessary to employ labour regularly, the amount of capital required will immediately go up considerably, and this must be taken into account when estimating the amount of land it is desirable to take.

These are generalities, but they have a direct bearing upon the financial side of the business, and those thinking of taking up the work would be wise to go into matters of this kind thoroughly before making a start.

If it is intended to go in for intensive cultivation, forcing, etc., further outlay will be necessary. Cold frames are not excessively expensive, but a big number of cloches and more elaborate forcing apparatus may soon run away with a considerable amount of money.

There is one matter in which the market grower will be wise to act with caution. It is better to take good land at a fair rental than to take poor land, though it be offered at a remarkably low rate, even when its poorness is taken into consideration.

So much more work has to be put into poor soil to make it capable of producing paying crops of vegetables, that the extra cost of working will soon absorb more than any reasonable difference in rent between the two classes of soil.

2389

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INDEX

A

	PAGE
ANGELICA	78
ARTICHOKE, CHINESE	16
Cultivation of	16
Soil	16
ARTICHOKE, GLOBE	13
Cultivation of	13
Harvesting	14
Propagating	14
Soil	13
Suckers	13
ARTICHOKE, JERUSALEM	15
Cultivation of	15
Harvesting	15
Manuring	15
Planting	15
ASPARAGUS	17
Asparagus fly	24
Blanching	20
Cultivation of	17
Diseases	23
Forcing	20
Grading	23
Harvesting	22
Pests	23
Planting	19
Seed sowing	17
Soil	17
Varieties	23

B

BALM	78
BASIL	78
BEAN, BROAD	25
Cultivation of	25
Diseases	29
Early crops	26
Exhibition	26
Harvesting	26
Manures	27
Pests	23
Pinching	28
Seed sowing	25
Varieties	27
BEAN, BUTTER	37

	PAGE
BEAN, DWARF	29
Cultivation of	29
Diseases	34
Exhibition	32
Forcing	31
Harvesting	32
Late crops	32
Manures	33
Pests	34
Seed sowing	29
Varieties	34
BEAN, HARCOT	37
BEAN, RUNNER	35
Cultivation of	35
Diseases	37
Exhibition	36
Harvesting	36
Manuring	37
Pests	37
Staking	36
Varieties	37
BEET, GARDEN	38
Cultivation of	38
Diseases	41
Early	39
Harvesting	40
Manuring	40
Pests	41
Seed sowing	39
Storing	40
Varieties	40
BEET, SEAKALE	43
Cultivation of	43
BEET, SPINACH	152
BEET, SUGAR	41
Cultivation of	41
Diseases	43
Harvesting	42
Pests	43
BORAGE	79
BORECOLE	84
Cultivation of	84
Manuring	84
Varieties	84
BROCCOLI	44
Cultivation of	44
Diseases	48
Early	47

	PAGE		PAGE
BROCCOLI—<i>contd.</i>		CELERY—<i>contd.</i>	
Exhibition	47	Exhibition	75
Harvesting	47	Harvesting	74
Manures	48	Manures	75
Pests	48	Pests	76
Planting	45	Planting	71
Protection	46	Planting on the flat	73
Varieties	48	Trenches	71
BROCCOLI, SPROUTING	49	Varieties	75
BRUSSELS SPROUTS	50	CHARDS	15
Cultivation of	50	CHERVIL	79
Diseases	52	CHICORY	91
Early crops	51	CHINESE ARTICHOKE	16
Exhibition	51	CHIVES	79
Harvesting	51	COMMON THYME	83
Manures	52	CRESS	91
Pests	52	CROPS, ROTATION OF	166
Varieties	52		
BUSH BASIL	78		
		D	
C		DISEASES. See SEPARATE PLANTS	
CABBAGE	53		
Autumn	54	E	
Cultivation of	53	ENDIVE	92
Exhibition	55		
Harvesting	54	F	
Manures	55	FENNEL	79
Summer	54	FINANCIAL SIDE	175
Varieties	55	FLAGEOLETS	37
CABBAGE, PICKLING	56		
CABBAGE, RED	56	G	
CABBAGE, SAVOY	56	GARDEN BEET	38
Diseases	57	GLOBE ARTICHOKE	13
Pests	57		
CARDOON	90	H	
CARROT	59	HERBS	78
Cultivation of	59	Angelica	78
Diseases	65	Balm	78
Exhibition	63	Basil	78
Forcing	62	Borage	79
Harvesting	60	Chervil	79
Late crops	61	Chives	79
Main crop	59	Fennel	79
Manures	64	Marjoram, pot	79
Pests	65	Marjoram, sweet	80
Varieties	64	Mint	80
CATLIFLOWER	66	Parsley	81
Cultivation of	66	Sage	82
Diseases	69	Savory	82
Exhibition	68	Sorrel	83
Harvesting	68	Tarragon	83
Manuring	68	Thyme	83
Pests	69	HORSE RADISH	93
Varieties	69		
CELERY	70		
Blanching	74		
Cultivation of	70		
Diseases	76		
Earthing up	72		

INDEX

179

J

JERUSALEM ARTICHOKE	PAGE 15
-------------------------------	------------

K

KALE	84
Cultivation of	84
Manuring	84
Varieties	84

L

LEEK	86
Blanching	88
Cultivation of	86
Diseases	89
Early	87
Exhibition	88
Manures	88
Pests	89
Varieties	89
LESSER GROWN VEGETABLES	90
Cardoon	90
Chicory	91
Cress	91
Endive	92
Horse radish	93
Mustard	93
Salsify	94
Scorzonera	95
LETTUCES	96
Autumn	97
Cultivation of	96
Diseases	99
Early	97
Exhibition	98
Pests	99
Varieties	98

M

MARJORAM, POT	79
MARJORAM, SWEET	80
MARKETING	169
MARROW, VEGETABLE	161
MINT	80
MUSTARD	93
MUSHROOM	101
Covered beds	104
Cultivation of	101
Diseases	104
Grading	104
Packing	104
Pests	104

MUSHROOM—contd

Soil	103
Spawning	101

N

NEW ZEALAND SPINACH	152
-------------------------------	-----

O

ONION	106
Cultivation of	106
Diseases	111
Exhibition	110
Harvesting	108
Late sown	109
Manures	111
Pests	111
Varieties	112
ONION, PICKLING	109
ONION, POTATO	113

P

PARSLEY	81
PARSNIP	114
Cultivation of	114
Diseases	115
Pests	115
Varieties	115
PEAS	116
Cultivation of	116
Diseases	120
Exhibition	119
Manures	119
Pests	120
Staking	118
Under glass	117
Varieties	120
PERPETUAL SPINACH	152
PICKLING CABBAGE	56
PICKLING ONION	109
POT MARJORAM	79
POTATO	122
Breeding	131
Cultivation of	122
Diseases	133
Early	128
Exhibition	131
Forcing	127
Harvesting	129
Manures	132
Pests	133
Spraying	126
Storing	129
Varieties	132
POTATO ONION	113
PRICKLY SPINACH	151

R		PAGE			PAGE
RADISH		137	SPINACH, PRICKLY		151
Cultivation of		137	SPINACH, SUMMER		151
Early		137	SPINACH, WINTER		151
Exhibition		138	SPROUTING BROCCOLI		49
Varieties		138	SPROUTS, BRUSSELS		50
RED CABBAGE		56	SUGAR BEET		41
RHUBARB		139	SUMMER SAVORY		82
Cultivation of		139	SUMMER SPINACH		151
Exhibition		141	SWEET BASIL		78
Forcing		140	SWEET MARJORAM		80
Manures		142			
Varieties		142	T		
ROTATION OF CROPS		166	TARRAGON		83
			THYME, COMMON		83
			THYME, LEMON		83
			TURNIPS		155
			Cultivation of		155
			Diseases		158
			Early		156
			Exhibition		157
			Harvesting		157
			Late crops		157
			Manures		158
			Pests		158
			Storing		157
			Varieties		158
			V		
			VEGETABLE MARROW		161
			Cultivation of		161
			Diseases		164
			Early		162
			Exhibition		163
			Harvesting		163
			Manures		164
			Pests		164
			Storing		163
			Varieties		164
			W		
			WINTER SAVORY		82
			WINTER SPINACH		151